INTERNATIONAL FOOD INFORMATION SERVICE

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FAB 42

THICKENERS AND GELLING AGENTS

SELECTED FROM VOLUME 1-5
FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Gesellschaft fur Information und Dokumentation, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen.

INTRODUCTION

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES
ASSISTANT EDITOR

1 E 42
Agar-agar composition.
Kiyota, R.
Japanese Patent 15 770/68 (1968 [Ja]

The patent covers a process for obtaining agar-agar from tangle (Laminaria sp.). IFT

1 R 30
Industrial uses of algae.
Johnston, C. S.
Process Biochemistry 3 (10) 11-14 (1968) [23 ref. En] [Heriot-Watt Univ., Edinburgh, Scotland]

Industrial uses of brown and red macroscopic algae are surveyed. Particular attention is paid to seaweed as a source of minerals, alginic acid, agar, and carrageenin. JN

1 T 44
Thickeners.
American Cyanamid Co.
British Patent 1 120 263 (1968) [En]

Small quantities of dioctyl sodium sulphosuccinate are added to water-soluble vegetable gum or cellulose ether thickeners to reduce agglomeration and to increase the rate of dispersion. IFT

2 P 238
Sour cream product.
National Dairy Products Corp.
British Patent 1 124 238 (1968) [En]

Commercial sour cream compositions are prepared by combining sour cream with 0.15-0.5% low methoxyl pectin, 0.20-0.40% gelatine, heating at 155-185°F, acidifying and homogenizing. IFT

2 T 47
[Gelling agent of sugar and pectin.]
Gelierhilfsmittel aus Zucker und Pektin und Verfahren zu seiner Herstellung.
Langen, A.; Etzweiler, H.; Thiele, H. (Pfeifer and Langen)
West German Patent 1 275 853 (1968) [De]

The gelling agent comprises granular sugar particles at least partially coated with a layer of finely ground partially or semi-esterified pectin. W&Co

2 T 61
Thickening agent.
Kelco Co.
West German Patent 1 272 887 (1968) [De]

Mixtures of hydrophilic Xanthomonas colloids and locust bean gum are employed as thickeners in aqueous media. IFT

2 T 63
Improved pectin developed by Sunkist.
Pritchett, D. E.
California Citograph 53 (12) 470 & 472 (1968) [En]
[Ontario Lab., Res. and Development Division, Sunkist Growers, Inc. Canada]

Hi-Poly produces outstanding gels of excellent resilience, resistance to syneresis and fine texture with or without added sugar. pH is unimportant except for taste, 45 mg/g pectin of Ca being needed at pH 3-3.5. Suggested uses are dietetic jams and jellies etc., milk puddings and high solids pectin candy. EAW

3 A 72
[Physical and chemical characteristics of pectin preparations. II. Analytical methods for testing the identity and purity of pectin preparations.]
Zur physikalischen und chemischen Charakterisierung von Pektinpräparaten. II. Analytische Methoden zur Prüfung von Pektinpräparaten auf Identität und Reinheit.
Mergenthaler, E.
Zeitschrift für Lebensmitteluntersuchung und Forschung 138 (5) 294-99 (1968) [13 ref. De]
[Deutsche Forschungsanstalt für Lebensmittelchemie, Munich, W. Germany]

Identity tests described comprise: viscometric mol. wt. determination; determination of galacturonic acid by decarboxylation with HI combined with distillation of CO_2 into excess $Ba(OH)_2$ and of methoxyl (both in Zeisel apparatus); acetyl content by hydrolysis; gel strength in the Cox and Higby 'Ridgelimeter'. Purity tests comprise the determination of heavy metals, H_2SO_4 residues, sulphated ash, pH, N-containing impurities, raw fibre (hydrolysis with ethylene glycol + H_2O + H_2SO_4; weigh ashed residue), and fat. The determination of the sugar extender is described. PU

4 H 442
Diet-type beverage.
Schupper, H. R. (Kelco Co.)
United States Patent 3 413 125 (1968) [En]

This patent covers aqueous carbonated non-alcoholic, diet-type beverages containing Xanthomonas hydrophilic colloids. IFT

4 Q 40
Freezable egg product.
Katz, M. (Howell Foods Corp.)
United States Patent 3 408 207 (1968) [En]

Freezable egg food product, comprising raw eggs, water, low methoxyl pectin and salt proteinates, is capable of retaining its flavour during prolonged freezing prior to cooking. IFT

4 R 114
[Influence of freezing rate on the quality of lyophilized "Tokoroten".]
Matsuda, Y.
Bulletin of the Japanese Society of Scientific Fisheries 34 (9) 836-40 (1968) [3 ref. Ja]
[Univ. of Fish., Konan-4, Minatoku, Tokyo, Japan]

Raw agar jelly was frozen at various freezing rates before lyophilization (plate temp. 60°C, chamber pressure 20-300 μHg). Jelly frozen at a higher freezing rate kept its shape unchanged in the lyophilized product, and its microstructure was fine. Jelly frozen at a slower rate gave a shrunken product with rough microstructure, while liquid N freezing gave cracks and projections but a fine microstructure. No significant difference in the flavour and texture of rejellified products was observed at different freezing rates. In view of processing simplicity, vacuum freezing was regarded as the most desirable pretreatment for lyophilization. SKa

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4 R 115
[Retention of flavour and elasticity of "Tokoroten" by freeze-drying.]
Matsuda, Y.
Bulletin of the Japanese Society of Scientific Fisheries 34 (9) 841-46 (1968) [8 ref. Ja]
[Univ. of Fish., Konan-4, Minato-ku, Tokyo, Japan]

Dried agars prepared by lyophilization and by a freezing-thawing dehydration process were compared for quality. Jelly-strength, degree of compressive strain and flexibility were physically measured, and colour, flavour and palatability were organoleptically evaluated after the products had reset. The quality of lyophilized agar was superior to that of agar dehydrated by a freezing-thawing process. Furthermore, lyophilization retained the quality and the pleasant flavour of the original jelly. When the products were stored in a carton box at room temp. for 3 months, the quality was unchanged. SKa

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4 T 140
Rehydration additive.
Edlin, R. L. (Kelco Co.)
Canadian Patent 802 145 (1968) [En]

Rehydration characteristics of dehydrated food products are improved by incorporation of small amounts of Xanthomonas hydrophilic colloids. IFT

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5 K 33
[Influence of lyophilized pectin preparations on physical and physical-chemical properties of chocolate.] Einfluss lyophilisierter Pektinpräparate auf gewisse physikalische und physikalisch-chemische Eigenschaften der Schokolade.
Lempka, A.; Wojciak, W.
Nahrung 13 (1) 27-31 (1969) [7 ref. De, en, ru]
[Ökonom Hochschule, Poznan, Poland]

Additions of normal or lyophilized pectins to chocolate mass increases viscosity and hardness, with consequent reduction of flow rate and adhesion to surfaces. Pectin additions to chocolate of 500 mg/50 g and 1000 mg/50 g increased chocolate hardness from 19.6 kg/cm² to 35.7 kg/cm² and 40.4 kg/cm² respectively. Methods of testing physical properties are given. The effect of pectin additions on chocolate held in an air-conditioning cabinet are given for hardness, flow properties, adhesion and viscosity. Degree of fineness, colour, and surface gloss were not affected. Similar observations were made with lyophilized fruit jams; an addition of lyophilized fruit to chocolate mass improved the chocolate flavour. IN

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5 L 186
[Natural polysaccharides as gelling and thickening agents.] Natürliche Polysaccharide als Gelier- und Dickungsmittel.
Gudjons, H. F.
Gordian 69 (1624) 64-69 (1969) [3 ref. De, en]

The chemistry of gel formation is explained. A table gives the occurence, main constituents, structure, properties, gelling ability and ind. applications of pectins, alginic acid, agar-agar, carrageen, carubin, guaran, gum arabic, tragacanth, tamarind gum (Tamarindenschleim) and linseed gum (Leinsamenschleim). Owing to their rapid water uptake the materials form lumps easily. This can be avoided by diluting finely divided poly-saccharides with 4 times the amount of sugar, dextrose or salt, or using them in granular form. In every case constant stirring during addition is necessary. RM

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6 G 213
Gel compositions.
Waitman, R. H.; Hoos, J. W. (General Foods Corp.)
Canadian Patent 802 833 (1968) [En]

The patent covers storage-stable gel compositions prepared from a Ca compound and pectin with a methoxyl content of 2.5-6.5%. The pH of the compositions is 3.5-4.5. IFT

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6 G 215
Jelly-forming compositions.
Pintauro, N. D.; DeFelice, D.; Bender, W. A. (General Foods Corp.)
Canadian Patent 802 835 (1968) [En]

Improved jelly-forming compositions comprise mixtures of pectin, fumaric acid and substantial excesses of dispersant. IFT

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6 R 160
[Agar-agar gels.]
Takagi, N.
Japanese Patent 780/69 (1969) [Ja]

Alginate, methoxy pectin or pectinate gels are soaked in aqueous seasoning solutions. IFT

8 T 236
Process for preparing a canned food product by the addition thereto of a water soluble alginate.
Kelco Co.
British Patent 1 142 807 (1969) [En]

When water-soluble alginates and Ca sources are used in place of part of the starch normally used for thickening purposes, foodstuffs to be canned remain free flowing during processing at temp. >160°F. IFT

8 T 237
Thickening process.
Kelco Co.
British Patent 1 142 808 (1969) [En]

See preceding abstr.

9 H 927
Diet-type beverage concentrate.
Schuppner, H. R. (Kelco Co.)
Canadian Patent 811 680 (1969) [En]

The concentrates for preparing aqueous carbonated non-alcoholic diet-type beverages have good mouthfeel characteristics and contain a Xanthomonas hydrophilic colloid. IFT

9 L 383
Starch thickeners.
Robinson, J. W.; Bookwalter, G. N
Tuschhoff, J. V. (A. E. Staley Manufacturing Co.)
United States Patent 3 437 493 (1969) [En]

A starch thickener composition for foodstuffs comprises a cross-linked cereal starch acylate and a phosphorus oxyhalide cross-linked hydroxypropyl cereal starch having a hydroxypropyl degree of substitution of ⩾0.10, prepared by reaction of a phosphorus oxyhalide with a granular hydroxypropyl cereal starch. IFT

10 G 415
[The effect of the composition of agar jelly on desiccation.]
Maly, K.; Pospisil, K.
Listy Cukrovarnicke 85 (2) 43-46 (1969) [Cs, en, de, ru] [Obor. Vyzkum Csl. Cokoladoven, Prague-Modrany, Czechoslovakia]

The properties and keeping quality of agar jelly depend mainly on the sucrose:starch ratio of the syrup. 5 agar mixes were prepared with different boiling ratios from 100:30 to 100:70 (sucrose:starch). The agar mix with a low starch syrup content tended to desiccate and recrystallize and the surface layers tended to recrystallize. The agar mix with a boiling ratio of 100:55 to 100:60 was found to have a suitable consistency and keeping quality after 13-wk storage at RH 40-80%. Addition of 5-10% invert sugar decreased the desiccation of the gel after 6-8 wk but addition of sorbitol had no effect. STI

10 M 670
Thickening power of flour increased: Wheat Research Institute research results.
Anon.
Food Technology in New Zealand 5 (2) 46 (1969) [En] [Wheat Res. Inst., Christchurch, New Zealand]

It is reported that the thickening power of flour is greatly increased by subjecting the flour to a process which destroys the α-amylase present. Acid is added to the flour slurry to reduce its pH to ~2.5. After a few min the slurry is neutralized. When HCl is used to inactivate the enzyme the NaCl formed after neutralization with NaOH replaces part of the salt which would be required in any subsequent formulation. No further details are given. BFMIRA

Vol 2

01 E 35
The use of centri-therm, expanding-flow and forced-circulation plate evaporators in the food and biochemical industries.
Hallström, B. (United Nations Industrial Development Organization)
Food Industry Studies ID/SER.I/1 51pp. (1969) [En]
[Alfa-Laval AB, Lund, Sweden]

This monograph, intended for food-processing industries in developing countries, describes and compares the characteristics of the title evaporators. Accessory aroma-recovery equipment is also described. Applications discussed include those involving dairy products, fruit juices, brewery products, starch derivatives, glucose and sugar solutions, coffee and tea extracts, thickeners, glue and pectin. Pre-investment data for 2 fruit-juice evaporation plants are presented. 12 specialized terms are listed and described. JN

01 G 2
Artificial milk.
Schnell, S.; Yishai, R.
Israeli Patent 24 161 (1969) [En]

An artificial milk is constituted from a mixture of 40% by wt. water, 16% sorbitol, 32% coconut oil, 2.8% cocoa butter, 1.6% vegetable shortening, 4% sugar and 5.6% agar-agar, albumin and flavouring. The water, sorbitol, coconut oil, cocoa butter and vegetable shortening are heated gently to liquification, sugar is added and mixed in thoroughly, the agar-agar, albumin and flavouring are then added, and the entire mixture is homogenized. W&Co

01 S 12
[Method of salting meat in the production of smoked products.]
Gorbatov, V. M.; Bushkova, L. A.; Borodulin, L. A.
USSR Patent 244 877 (1969) [Ru]

Losses of extracted substances during pickling are said to be reduced and the quality of the finished product improved by addition of a gelling agent, such as agar-agar, at a 0.1-1.0% concn. to the preservative. W&Co

2 L 112

Starch derivatives for the food industry.
Wurzburg, O. B.
Abstracts of Papers. American Chemical Society 158: AGFD 22 (1969) [En] [Nat. Starch and Chem. Corp., 1700 W. Front St., Plainfield, New Jersey 07063, USA]

Starch derivatives are widely used for thickening, stabilizing, providing texture, and thus improving quality and appearance, of many food systems. 2 basic types of modification of the granule are involved. In the first, which involves crosslinking the granule by reacting it with difunctional reagents capable of reacting with 2 or more hydroxyls to form bridges between molecules, extremely low levels of substitution are involved and the purpose is to strengthen the granule. The other involves reacting hydroxyls on the starch molecules with monofunctional materials to introduce substituent groups capable of minimizing intermolecular association or retrogradation. AS

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2 L 129

[Method for producing salad sauce, potato chips sauce and/or mayonnaise products.]
Reinders, M. A.; Gotlieb, K. F. (Cooperatieve Verkoop- en Productie-Vereiniging van Aardappelmeel en Derivaten AVEBE GA)
Netherlands Patent Application 6 715 194 (1969) [Nl]

Starch products which are soluble in cold water and thus can be used as emulsifiers and thickeners are obtained from a flaked material containing ⩾90% amylopectin by treatment with a polyfunctional reagent and converting the resultant product into a form in which it is soluble in cold water. The initial flaked material is preferably obtained by fractionating natural starches (e.g. potato, corn or tapioca starch) to obtain straight-chain amylose and branched-chain amylopectin. For the production of sauces, combinations of amylopectins may be used which are cross-linked to different degrees and have different swelling properties. W&Co

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2 P 199

[Continuous manufacture of 'vla'.]
Eikelenboom, J. K.
Voeding en Techniek 3 (43) 1022-27 (1969) [14 ref. Nl] [Menken Melk NV, Wassenaar, The Netherlands]

Menken Melk NV are manufacturing vla (a custard-type product) by a continuous process involving the use of 2 Alfa-Laval VTIS sterilizers of 3600 and 6000 l./h capacity, with heating at 142-145°C for 2-5 sec, vacuum pre-cooling and cooling to 5°C. The product, which is packaged (not under aseptic conditions) in ½ l. polystyrene tubs with Al lids, is said to have a good shelf life. An output of 12 000 tubs/h is possible. The product is manufactured from a special powder, the most critical ingredient of which is the starch thickening agent. A schematic layout of the process is included. HBr

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2 R 45

[Possible applications of agar-agar in the confectionery industry.] Agar-Agar und seine Einsatzmöglichkeiten in der Süsswarenindustrie.
Behrens, H. H.
Fette, Seifen, Anstrichmittel 71 (8) 693-95 (1969) [De]

A survey is given of the production of agar agar, the factors influencing its quality and the principles of gel formation. The special advantages of agar agar as a gelling agent in confectionery are easy processing, low use concn. (0.1-1.2%) and high gel strength. MDB

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3 D 136

[Jam.]
Union of Soviet Socialist Republics, Komitet Standartov
Gosudarstvennyi Standart GOST 6442-69 12 pp. (1969) [Ru]

This standard was introduced on 1 Jan., 1970. It lists characteristics and descriptions of different shapes of fruit jams and jellies, the latter containing agar (Baltic Sea), pectin, or agaroid (Black Sea agar), and regulations on inspection and analysis, packaging, labelling, transport and storage. Composition standards for contents of moisture, reducing substances and ash, and for titratable acidity and max. Cu content are given for all or some of the products. There is no tolerance for Pb and As salts in any of the products and for H_2SO_3 derivatives and benzoic acid in jellies. Max. content in other forms of jam is fixed at 100 mg/kg for H_2SO_3 derivatives as SO_2 and at 0.07% for benzoic acid. Special packaging and storage regulations for products intended for the Arctic, Soviet Far North and remote regions are listed. SKK

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3 P 295

Milk gel composition.
Shuppner, H. R., Jr. (Kelco Co.)
Canadian Patent 824 635 (1969) [En]

Milk gelling compositions comprise mixtures of tetra-alkali metal pyrophosphate, edible calcium salts, Xanthomonas hydrophilic colloid and locust bean gum. IFT

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3 P 303

[Method for preparing a sterilized custard or blancmange product with good storage qualities.]
Muynck, E. P. L. de; Branteghem, A. E. van (NV Stijfsel-en Glukosefabriek "Sas Van Gent")
Netherlands Patent Application 6 801 430 (1969) [Nl]

A mixture is prepared of milk, sugar, colourings and flavourings, a thickening agent with a high content of amylose (obtained by fractionating starch flour), and a further, non-amylaceous thickening agent. The mixture is heated for ⩽3 min to a temp. of 130-155°C, optionally homogenized and cooled, and packaged aseptically

The improvement consists in the use of the non-amylaceous thickening agent which entirely or partly consists of a water-soluble alginate, e.g. sodium alginate, and in adding the salt of a multivalent metal, e.g. calcium gluconate. W&Co

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3 T 104
[Method for making shallot paste.]
Sica-Sol
French Patent 1 560 736 (1969) [Fr]

A method of making shallot paste with the same flavour as fresh shallots is described. Clean bulbs have their outer coverings removed by mechanical peeling and are boiled carefully to obtain a homogenous paste. To ensure a pleasing appearance and good shelf life 0.1% SO_3 10% NaCl, 0.8% citric acid and 1% pectin are added. The paste is packaged in metal tubes or cans. W&Co

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5 H 512
Cloud stability in the absence of various orange juice soluble components.
Baker, R. A.; Bruemmer, J. H.
Citrus Industry 51 (1) 6-11 (1970) [12 ref. En] [Fruit & Vegetable Products Lab., Winter Haven, Florida 33880, USA]

Studies of centrifuged orange juice cloud show that a soluble pectin matrix is not required for cloud stability. When cloud was separated from its original serum and resuspended in water or synthetic sera, the resulting suspension exhibited an unusual degree of stability. Stability was lost when the synthetic system contained pectin, calcium chloride, and potassium chloride. Enzymic removal or destruction of pectin in natural orange juice serum stabilized the resuspended cloud without heating. Thus, enzyme treatment could replace heating for commercial stabilization of orange juice cloud. AS

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5 H 566
[Technology evolution in fermentation industry.]
Cantarelli, C.
Industrie Alimentari 8 (2) 92-108 (1969) [64 ref. It] [Istituto di Industrie Agrarie, dell'Univ. Perugia, Italy]

Advances in beverage processing technology are summarized, with specific ref. to product formulation (acidulants, thickening agents, antioxidants, germicides, flavourings), unit operations (centrifugal separation, filtration, thermal treatments, evaporation, freeze-concentration, aroma recovery, drying, aromatization, agglomeration) and fermentation processes (beer, wine and vinegar manufacture). CEB

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5 J 467
[Jam. Cold Production.] Herstellen von Marmeladen auf kaltem Wege.
Ohler, H.
Gordian 70 (2) 73-4 (1970) [De]

Production of jams in the cold from fresh or frozen fruit puree, sugar, dry pectin powder and organic acid (lactic, citric or tartaric) is described. Mixed finely divided sugar and pectin is added to fruit puree and acid with continuous stirring in an acid resistant container, to a final sugar content of 60%, DM content 64-65%. The air introduced during stirring makes for a lighter product than boiling. Keeping quality is ensured by high sugar content. Product can be spread and has excellent fresh fruit flavour, but whole fruit jam cannot be produced. Recipes for raspberry and mixed strawberry-raspberry jam are given. RM

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5 J 475
[Studies on Japanese pear (Nijisseiki) juice. I. Separation of stone cells from pear puree and factors involved in the separation.]
Yamane, A.
Journal of the Agricultural Chemical Society of Japan 43 (7) 434-40 (1969) [11 ref. Ja, en] Food Technological Inst. of Tottori Prefecture, Tottori-ken, Japan]

Stone cells in the pear puree can be separated from the original juice by an ultramizer (Seikensha Co., Ltd, Tokyo), which has 8 blades and operates at 8000 rev/min. It separates the stone cells when the original pulpy juice passes through fine slits at high speed and under high pressure. The pulp associated with the stone cells interfered with the separation, but the ultramizer was able to cut the pulp and decrease the viscosity of the juice. The viscosity was closely related to the concn. of pulp and soluble pectin. MY

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6 D 464
Ice cream. Schedule of the regulations. 3. Federal German Republic.
Anon.
Naarden Nieuws 20 (210) 6-7 (1969) [En]

W. German regulations as amended 15 Mar. 1961 are reproduced in tabular form. Compulsory, permitted and prohibited ingredients (milk products, egg products, fruit products, sweetening agents, natural flavours, artificial flavours, fruit acids, colouring matter, coverings, thickeners and gelling agents) and labelling of 7 types of ice cream are listed. [See also FSTA (1969) 1 12D791 & (1970) 2 5D311.] RM

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6 H 738
Foam.
Anon.
International Brewers' Journal 106 (1253) 73-75 (1970) [En, de, fr]

Lack of fundamental knowledge of foam stability has led to the use of foam improvers such as Co, polyethylene oxides (which decrease bubble size at levels of 40-160 ppm but block filters and inhibit gas release), phosphorylated mannan at 20-80 ppm, and a synthetic polysaccharide to be used in conjunction with a synthetic gum and corn syrup.

Adhesion of foam to glass may be effected by the use of a polysaccharide produced by Xanthomonas campestris or by Zn associated with gum arabic or propylene glycol alginate. PEG

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6 L 391
[Use of agar-agar in confectionery.]
Fabry, Y.
Revue des Fabricants de Confiserie, Chocolaterie, Confiturerie, Biscuiterie 44 (12) 26, 29-30, 33, 35, 37 & 39-40 (1969) [Fr]

Use of agar-agar as a gelling and stabilizing agent is described. Formulations are given, and causes of failures occurring in confectionery practice, together with advice on their prevention are discussed. IF

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6 M 520
Flavourings in baked goods. II. Quality control in flavour compounding.
Hopkins, G. M.
Baking Industries Journal 2 (9) 40-42 & 44 (1970) [En] [Barnett & Foster Ltd., Denington Ind. Estate, Wellingborough, Northants., England]

Methods of assessing taste and aroma, and the use of gas liquid chromatography for quality control of flavourings are discussed. The degree of concn. of fruit juices for flans and pies can be checked by testing the phosphate, K and serine levels; pectin, SO_2 and citric acid contents should also be determined. Synthetic flavouring agents, emulsifiers, stabilizers, thickeners, solvents, antioxidants and enzymes used in the manufacture of flavourings are considered, together with quality control tests which can be applied. The importance of taste panel testing is emphasised. Bakery product flavourings may be obtained as flavour bases, terpeneless oils, essential and blended oils, essences, natural extracts, flavouring emulsions, colour/flavour compounds, juice compounds, concentrated soft fruit juices or spray-dried powders. Quality control tests for each are suggested. PEG

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6 T 181
Gelling agents: resemblances: differences: mode of setting: controlling the formation.
Cakebread, S. H.
Confectionery Production 36 (2) 86-87 & 89-90 (1970) [11 ref. En]

The structures of amylose, pectinic acid, agar, alginic acid and carrageenan are described, the basic unit and type of linkage between each unit being illustrated. The mode of gelling and methods of controlling gel formation of these compounds are discussed. BFMIRA

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7 H 876
A study of the consistency of tomato juice as influenced by pH changes and cell wall components.
Crean, D. E.
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (4) 1742 (1969) [En] [St. Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

Consistency of tomato juice has been shown to be greatly influenced by pH changes prior to heat treatment. An alcohol-insoluble fraction, corresponding to the cell wall materials, was prepared from tomato juice and suspended in several buffer solutions. Their consistencies and the viscosity of liquid portions obtained by centrifugation were measured by viscosimeter, and a carbazole method was used for pectin analysis of these supernatants and of whole tomato juice. Extractibility of pectin from the cell wall materials was not significantly affected by pH, hence changes in viscosity could be attributed to physical changes in cell wall materials and pectins themselves. Model systems showed 2 peaks in a pH-viscosity curve, due to the pH effect on cell wall materials (which have glycuronic acid in hemicellulose fraction in the cell wall) and on soluble pectins (which contain galacturonic acid). The effect was reversible; the original consistency could be completely restored by re-adjusting the pH to its original value. AL

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7 J 688
[Pectin [from apple pulp] for jellied confectionery products.] Pektin für gelierte Süsswarenerzeugnisse.
Ohler, H.
Süsswaren 13 (21) 1242-43 (1969) [De]

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7 P 864
A cheese product.
Rohlfs, H.-A.; Koch, W.; Scheurer, -. (Benckiser-Knapsack GmbH)
British Patent 1 180 716 (1970) [En]

A method for the manufacture of processed cheese features the use of a thickening agent, e.g. phosphate-modified starch, as a replacement for a portion of a conventional emulsifying salt. Application of the invention is given in a number of examples. In one example, 1.5 kg sodium polyphosphate (59.5% P_2O_5, pH 9.1) and 2 kg phosphate-modified starch, which has been dispersed in 50 kg water and heated to 85°C for 5 min, are incorporated into a mixture of 50 kg Emmental and 50 kg Cheddar cheese and the mixture is melted and emulsified at 85°C for 7 min. Other thickening agents, such as carob bean flour, and a temp. of 130°C may be employed. It is claimed that the cheese product has a considerably improved keeping quality. FL

8 L 545
[Manufacture of jellies with pectin.] Die Herstellung von Dessertpralinen mit Pektin. [A lecture]
Lohmann, R.
Fette, Seifen, Anstrichmittel 72 (4) 315-17 (1970) [De] [Pomosin Werke Grossenbrode GmbH, Grossenbrode, Holstein, W. Germany]

The gelling properties of pectins and their use in food jellies are briefly outlined. MDB

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8 P 984
Fruit-flavoured spread.
Eldridge, K. E.; Linteris, L. L. (Unilever Ltd.)
British Patent 1 189 854 (1970) [En]

Formulae are given for the preparation of fruit-flavoured spreads by blending an edible fat in liquid form, e.g. melted butter, with a liquid fruit preserve stock (consisting for instance of strawberry juice concentrate, sucrose, water, pectin and sodium citrate) to obtain uniform, fine dispersion of the fat in the liquid stock, followed by gelation. The finished product is said to have consistency similar to that of jam or jelly, pleasing appearance, excellent flavour and good storage life. FL

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8 P 988
[Studies on the production of mild and aromatic yoghurt. IX. Thickening resulting from mechanical treatment of the coagulum, its effects, stages and practical value.]
Kurmann, J. A.
Schweizerische Milchzeitung 95 (86) 739-41 (1969) [14 ref. Fr, de] [Ecole d'Ind. Laitiere et Sta. Laitiere, 1725 Grangeneuve-Fribourg, Switzerland]

Expt. on thickening of yoghurt are described and discussed in detail. The main conclusion is that thickening is primarily effected by the physical factor of cooling which causes ∼60% increase in coagulum firmness, whereas other factors have a much smaller effect (e.g. hydration, ∼30%; thixotropy, ∼10%). In view of the expt. results, the following procedure is recommended for yoghurt manufacture: incubation at a constant temp. of 41-44°C till pH 5.30 is reached; subsequent incubation at decreasing temp. (cessation of heating), until pH 4.7 is reached; shock cooling to 38-30°C; mechanical treatment by controlled stirring; slow cooling to <10°C; cold storage for ≥1 day, preferably for 2 days at 10-12°C; consumption at 10-12°C, for optimal viscosity, freshness and flavour. [See FSTA (1969) 1 10P962 for part VIII.] SKK

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8 P 989
[Studies of the production of mild and aromatic yoghurt. IX. Thickening resulting from mechanical treatment of the coagulum, its effects, stages and practical value.]
Kurmann, J. A.
Lait 50 (491/492) 49-65 (1970) [14 ref. Fr, en]

See preceding abstr.

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9 A 289
Gum technology in the food industry.[A book]
Glicksman, M.
xiii+590pp. (1969) [Numerous ref. En] New York and London: Academic Press. Price 257s. [General Foods Corp., Product Development Lab. ,Corporate Res. Dept., Tarrytown, New York, USA]

This book, the 8th in the Food Science and Technology Series of Monographs, is a technical compilation on hydrocolloid technology as it pertains to the food industry. Each group of gums is considered individually and information on newer gums not yet approved for food use is also given. Chapters are: Terminology and classification of gums(pp. 1-14, 23 ref.); Functions of gums in food products (pp. 15-55, 60 ref.); Rheology, texture and gums (pp. 56-93, 53 ref.); Natural plant exudates (gum arabic, gum ghatti, gum karaya, gum tragacanth) (pp. 94-129, 107 ref.); Plant seed gums (locust bean, guar, psyllium seed, quince seed) (pp. 130-58, 68 ref.); Pectins (pp. 159-90, 75 ref.); Arabinogalactan (larch gum, stractan) (pp. 191-98, 28 ref.); Seaweed extracts (agar, carrageenan, furcellaran, alginates) (pp. 199-273, 211 ref.): Starches (pp. 274-333, 112 ref.); Microbial gums (dextran, polysaccharides B-1459, B-1973 and Y-1401, phosphomannan Y-2448) (pp. 334-58, 63 ref.); Gelatin (pp. 359-97, 110 ref.); Cellulose gums (microcrystalline cellulose, sodium carboxymethylcellulose, methylcellulose, hydroxypropylmethylcellulose, hydroxypropylcellulose, methylethylcellulose, other cellulose derivatives) (pp. 398-471, 211 ref.); Synthetic hydrocolloids (polyvinylpyrrolidone, carboxyvinyl polymers, methyl vinyl ether/maleic anhydride poylmers, ethylene oxide polymers) (pp. 472-508, 84 ref.); and Analysis of identification of hydrocolloids (pp. 509-54, 81 ref.). Subject and author indexes are included. JA

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9 D 718
Current food additives legislation - Italy.
Food and Agriculture Organization
Current Food Additives Legislation 1968 (118) 6 (1968) [En] [Rome, Italy]

Ministerial Decree of 14 June 1968 amends the Ministerial Decree of 31 March 1965 regulating the use of chemical additives in the preparation and preservation of foodstuffs. The provisions are designed chiefly to bring Italian regulations into line with the Directives on the Council of the European Economic Community [Curr. Fd Addit. Legisl. 1967 (110) 2]. Diphenyl (biphenyl), o-phenylphenol and sodium o-phenylphenate are added to the list of permitted bactericides. Further changes in the Ministerial Decree include: gels and thickeners (extension of permitted uses of furcellaran to canned cod, max. 2%); yeast nutrients (minor changes in the specification for calcium and monobasic phosphate); and the use of l-ascorbic acid (permitted in soft wheat flours, max.200 mg/kg). VJG

9 J 919
[Production of pectic substances and their technological value.] [A review]
Drzazga, B.
Przemysl Spozywczy 24 (3) 96-100 (1970) [35 ref, Pl, ru, de, fr, en]

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9 L 576
[Two-layer jelly.] Zweischicht-Gelee.
Anon.
Zucker- und Süsswarenwirtschaft 23 (2) 69-70 (1970) [De]

A brief description is given of a confectionery product comprising a layer of marshmallow and a layer of agar gel; the 2 layers have different colours, consistencies and chewing properties. It is important that the 2nd layer is applied to the 1st as soon as possible during manufacture to ensure a good bond. IN

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10 D 825
Current food additives legislation - Argentina.
Food and Agriculture Organization
Current Food Additives Legislation 1968 (119) 1-15 (1968) [En] [Rome, Italy]

Chapter 18 of Decree No. 4238 of 19 July 1968, which issues regulations on the inspection of products and by-products of animal origin and derivatives thereof, relates to additives. Argentinian regulations governing: preservative or protective additives, antioxidants, flavourings, antispattering agents, gelling agents, thickeners, sweeteners, anticaking agents, vehicles for other additives, enzymes and colours are given in detail. VJG

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10 T 358
[Agar-agar.] Agar-Agar.
Firma Iranez SA
Kakao und Zucker 22 (3) 107-08 (1970) [De] [Marseille, France]

Production of agar-agar is described and its physical and chemical properties are outlined. The compatibility between agar-agar and various polymers is given, together with the solubility characteristics of agar-agar. The advantages of using the product in the confectionery industry are discussed, and a standard jelly recipe is given. IN

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11 F 590
[Compartmented food container.]
Oliver, M. G. C.
French Patent 1 572 521 (1969) [Fr]

The container has a separate compartment in the lid to hold ingredient(s) which can be mixed in with the main product by the consumer. An example quoted is a thickening agent and sugar packaged in the lid for addition as required to the fresh cream in the container. W&Co

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11 G 389
[Production of fruit and milk jellies with low sugar contents, using highly-methylated pectins and pectin pectyl-hydrolase.]
Lech, W.; Wieclawek, W.; Daniewski, P.
Przemysl Spozywczy 24 (5) 201-03 (1970) [Pl, ru, en, fr, de]

Apple jellies were prepared from 100 ml reconstituted apple juice (250 g dried concentrate in 1 l. water), 20 ml pectin solution (8 or 16 g highly-methylated, 75% esterified pectin, 150-jelly grade, in 120 ml water), 10 or 20 ml calcium lactate solution (10 g/100 ml) or $CaCl_2.6H_2O$ solution (5 g/100 ml), and 5 or 10 ml pectin pectyl-hydrolase solution (100 mg Nutritional Biochemicals Corp. preparation in 100 ml water); water, if necessary, was added to bring vol. to 150 ml and sugar (7 g/100 ml) was occasionally added. The mixed ingredients (pH 4.7) were allowed to gel in open cylindrical vessels for 7-8 h at 20°C. Milk jellies were prepared similarly with 100 ml reconstituted dried skim-milk (150 g in 1 l. water) and were allowed to gel for 1 h. Proportions of ingredients and results of hardness measurements (force needed to disrupt jelly) are tabulated. It is concluded that the procedure outlined results in formation of low-sugar jellies with firm, uniform texture, that milk jellies gelled well even in the absence of Ca salts, and that they were much harder than apple jellies. Characteristics of the jellies are discussed from the viewpoint of dietary use. SKK

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11 J 1226
Multi-purpose gels used in preparing new citrus products.
Moore, E. L.; Rouse, A. H.; Atkins, C. D.; Hill, E. C.
Proceedings of the Florida State Horticultural Society 82: 224-27 (1969) [2 ref. En] [Citrus Expt. Sta., Lake Alfred, Florida, USA]

Formulations for preparation of 2 citrus gels from pectins, carrageenans and gum, for use as salad gels and in jellied sauces are shown, and the processing procedure for one product is outlined. No noticeable colour or flavour changes occurred in salad gels and jellied sauces stored at 32 or 40°F for 1 yr. Salad gels prepared from crushed grapefruit sections, either grapefruit or mint flavoured, changed the least in flavour of all salad gels after 1 yr storage at 80°F. Studies of jellied sauces at 80°F indicated that it would be preferable to prepare these as needed from frozen concentrates. Gel-coated grapefruit halves shrink-wrapped in polypropylene film retained freshness longer at 40°F than controls without gel coating. PEG

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11 L 727
[Process for obtaining a product for promoting food gels, particularly for rapid preparation of jams.]
Unipectine
French Patent 1 579 571 (1969) [Fr]

Product, which is added to the substance to be set, comprises sugar, pectin and acid.

Preparation is by moistening the sugar, in grains or crystals, adding the pectin, in powder form so that it adheres to the sugar, drying and adding the acid. Specifically, the granular dimension of the sugar is 0.4-1.0 mm (preferably 0.6-0.8 mm) and the pectin is finer than 2 mm. Thus the pectin will not gel until the sugar is sufficiently dissolved. W&Co

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11 P 1511
Sour cream production.
Starook, S. L.; Stimpson, E. G. (Kraftco Corp.)
Canadian Patent 842 720 (1970) [En]

Sour cream is produced by direct acidification with edible acids such as lactic acid, after which the cream composition is heated and stabilized by addition of mixtures of gelatin and pectinous material. IFT

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11 P 1589
[Yoghurt preservation.]
Moringa Milk Industry Co. Ltd.
Japanese Patent 8623/70 (1970) [Ja]

Liquid skim-milk containing added dried skim-milk powder and thickened with carageenan or other thickeners, is sweetened, sterilized, mixed with a starter and tank fermented to yield a product which is combined with fruit. IFT

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11 P 1602
Casein dispersion as a factor in milk processing properties.
Davidov, R. B.; Kulebyakin, Yu. I.; Yaroshkevich, A. P.
International Dairy Congress (18th, Sydney) 1E: 524 (1970) [En] [K. A. Timiryazev Agric. Acad., Moscow, USSR]

Condensed milk produced from milk from the Simmental breed (mean diam. of casein micelles, 75 nm) was resistant to thickening; its viscosity was 28-30 poises when fresh and 43-45 after storage at 10°C for 12 months. The product from milk of the Red Steppe breed (mean diam. of casein micelles, 63 nm) thickened progressively; viscosity was 140-150 poises after storage. SJR

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12 A 382
[Pectins] Pektine. [A review]
Pilnik, W.; Zwiker, P.
Voedingsmiddelentechnologie 1 (12) 274-89 (1970) [151 ref. De] [Abteilung für Lebensmittelwissenschaft der Landwirtschaftlichen Hochschule, Wageningen, The Netherlands]

This comprehensive review on pectins covers the subject under the following headings: definition, literature, structure, occurrence and role in plants, properties, gel characteristics, pharmacology, uses in the food industry, comparison with other gelling and thickening agents, the pectin industry, standardization and analysis. HBr

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12 H 1314
Cloud stability in the absence of various orange juice soluble components.
Baker, R. A.; Bruemmer, J. H.
Proceedings of the Florida State Horticultural Society 82: 215-20 (1969) [12 ref. En] [US Fruit & Vegetable Products Lab., USDA, Winter Haven, Florida, USA]

Studies of centrifuged orange juice cloud show that a soluble pectin matrix is not required for cloud stability. When cloud was separated from its original serum and resuspended in water or synthetic sera, the resulting suspension exhibited an unusual degree of stability. Stability was lost when the synthetic system contained pectin, $CaCl_2$ and KCl. Enzymic removal or destruction of pectin in natural orange juice serum stabilized the resuspended cloud without heating. Thus, enzyme treatment could replace heating for commercial stabilization of orange juice cloud. Expt. procedure is outlined, and results are shown graphically. AS

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12 L 833
Development and operation of the continuous filtration process for the first carbonation juice in a cane sugar factory.
Chen, W.; Hsu, Z. H.; Tsaï, M. T.
Proceedings of the International Society of Sugar Cane Technologists 13: 1760-67 (1968) [6 ref. En] [Taiwan Sugar Expt. Sta., Taiwan]

Continuous filtration of the first carbonation juice was carried out by incorporating a belt rotary drum filter and properly designed thickener in the batchwise carbonator system. The equipment and installation are described. In developing and adjusting actual factory operating conditions, emphasis was put on control of the coagulation process to render flocculation uniform and to keep the thickening process in rapid flow and free from any stagnating condition, so that the mud was not only of filtrable consistency but also free from colour-bearing compounds. However, when the condition of refractory juice - due to agro-climatic influences - impeded the smooth running of the process, it was better to use continuous carbonation procedures so that a smooth flow of uniform flocs could be obtained. AS

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12 L 846
Structure, conformation, and mechanism in the formation of polysaccharide gels and networks. [A review]
Rees, D. A.
Advances in Carbohydrate Chemistry 24: 267-332 (1969) [221 ref. En] [Chem. Dept., Univ., Edinburgh, Scotland]

The basis of gel formation is reviewed and the relationship of the overall properties of the gel with molecular structure is discussed. The chapter deals almost entirely with gels with a fairly permanent network structure formed from polymer solutions. The structure and conformation of selected gel-forming polysaccharides (cellulose derivatives, agar, carrageenans and other natural sulphates, glycuronans and derivatives) are dealt with. The way in which chains are held together in junction zones and methods for the characterization of junctions are discussed. Polymer-polymer interactions in junction zones are also dealt with, covering covalent linkages (Sephadex and others); double-helix junctions (sulphates and related polysaccharides); microcrystallites (glycuronans and derivatives); entanglement and shared counterions (O-(carboxymethyl)cellulose); and micelle junctions (O-methylcellulose). AL

12 P 1770
International aspects of the preservation of fermented milk products by pasteurization.
Schulz, M. E.; Voss, E.
International Dairy Congress (18th, Sydney) 1E: 417 (1970) [3 ref. En] [Bundesanstalt für Milchforschung, Kiel, W. Germany]

Condensed skim-milk yoghurt (pH 3.8-4.0), with or without added sugar and fruit flavour, pre-thickened with hydrocolloids before processing by high temp. heat treatment and homogenization and packaged aseptically in light-proof bags is recommended for the populations of warm countries. BEPC

12 P 1884
Effect of polyphosphates on the thickening rate of batch-sterilized evaporated milk
Klepacka, M.; Pijanowski, E.
International Dairy Congress (18th, Sydney) 1E: 259 (1970) [En] [Agric. Univ., Warsaw, Poland]

Addition of 0.05-0.07% di-, tri- or tetra-phosphate or 0.05% trisodium citrate to raw milk prevented heat coagulation during sterilization; tri- and tetra-phosphate decreased and di-phosphate increased the rate of age thickening during storage at 30°C. SPT

12 R 425
Phycocolloids.
Durrant, N. W.; Sanford, F. B.
Fishery Industrial Research 6 (1) 15-51 (1970) [26 ref. En] [Bureau of Commercial Fisheries Div. of Food Sci., U.S. Dept. of the Interior, Washington, D.C. 20240, USA]

This review type article, well illustrated with photographs, discusses the phycocolloids extracted from seaweed. The phycocolloids of major economic importance are agar-agar, algin and carrageenan, and their harvesting, manufacturing, properties and uses are considered individually. Those of minor economic importance are laminarin, funoran and fucoidan. Agar is obtained mainly from the seaweed Gelidium cartilagineum and is harvested largely by skin-diving; it is extracted in an autoclave and purified in stages (one of which is freezing). Agar consists of 2 fractions, agarose and agaropectin. The most important use of agar is in media for bacteriological cultures, and it is also used as a thickener, emulsifier, gelation agent, absorbant, lubricant and inert carrier. Algin is obtained from the gaint kelp Macrocyst pyrifera, and is harvested mechanically. It may be manufactured by Green's cold process or the Le Gloahec- Herter process. It is a hydrophilic derivative of alginic acid, composed of β-(1-4) linked D-mannuronic acid and anhydro L-guluronic acid. Algin products have wide uses as stabilizers in ice cream and for emulsifying, thickening, suspending, stabilizing, gelling, plasticizing, flocculating, binding and film forming. Carrageenan is obtained primarily from the red seaweeds Chondrus crispus (Irish moss) and Gigartina stellata, which are harvested with long rakes. Carrageenan is extracted from the moss by hot water, and the solution dried on hot rolls and precipitated with isopropyl alcohol. The hydrocolloid carrageenan is a galactosan sulphate having kappa ($\varkappa$) and lambda (λ) fractions; a 3rd major type is iota carrageenan occurring mainyl in Eucheuma spinosum. Its main uses are in non-settling chocolate milk drinks and other foods. AL

12 R 427
[Use of polyphosphates in agar processing. II. Effects of polyphosphates on strength of agar gel.]
Matsuhashi, T.
Journal of Food Science and Technology (Tokyo) 15 (12) 563-68 (1968) [10 ref. Ja, en] [Nagano State Lab. of Food Technology, Nagano, Japan]

Strength of agar gel containing 50-200 ppm polyphosphates was decreased when the agar solution was boiled for $\geqslant$1 h. Gel strength was irreversibly reduced by the addition of 5 ppm sulphuric acid. Whiteness of dried agar was improved by the addition of polyphosphates. HE

Vol 3

1 H 34
Flow behaviour of concentrated orange juice.
Mizrahi, S.; Berk, Z.
Journal of Texture Studies 1 (3) 342-55 (1970) [14 ref. En] [Dept. of Food and Biotechnology, Technion, Israel Inst. of Technology, Haifa, Israel]

Orange concentrate, at the 60-65° Brix concn. level, is a non-Newtonian fluid with yield stress and time dependent behaviour. While recovery from low-rate shear is reversible, shear at high rate causes irreversible destruction of the viscous structure. Part of this effect is due to disintegration of pulp particles. Pulpless concentrate (serum) is also non-Newtonian, but yield stress and time dependent behaviour are present only when pectin concn. is high. Depectinized serum is Newtonian. The effect of temp. on flow properties of all 3 types of material was studied. AS

1 P 89
Sour cream.
Starook, S. L.; Stimpson, E. G. (Kraftco Corp.)
United States Patent 3 507 663 (1970) [En]

To sour cream base mix containing $\sim 20\%$ butterfat and $\sim 9\%$ SNF are added 0.15-0.5% by wt. low methoxyl pectin and 0.2-0.4% gelatin; the mix is heated to 155-185°F for 5-30 min, acidified to pH 4.0-4.5 by addition of an edible acid (e.g. lactic acid, glucono-Δ-lactone, acetic acid, citric acid, fumaric acid or their mixtures thereof), and homogenized. The sour cream product, which is said to have improved stability, is packaged at $\geqslant$150°F. HBr

1 P 121
[Chocolate-cheese product.]
Rokko Butter Co. Ltd.
Japanese Patent 14 110/70 (1970) [Ja]

Natural cheese compositions containing pectin, sucrose and edible salts are cut into small pieces and mixed with melted chocolate to produce a hardened product in which the cheese does not shrink away from the chocolate. IFT

1 Q 16
Low-calorie egg product.
Jones, R. E. (Tillie Lewis Foods Inc.)
Canadian Patent 848 919 (1970) [En]

Low-calorie egg product comprises mixtures of liquid egg white, liquid whole egg, milk SNF, sweet whey solids, vegetable protein solids and hydrophilic thickener. The product is dehydrated to yield a powder capable of exhibiting the functional foaming and stiffness of whole fresh eggs upon reconstitution. IFT

1 S 22
Gelled meat product.
Schupper, H. R., Fr. (Kelco Co.)
United States Patent 3 519 434 (1970) [En]

Homogeneous gelled meat product contains both a Xanthomonas hydrophilic colloid and locust bean gum in quantities sufficient to form a gel through interaction. IFT

1 T 49
[Process for production of an edible gelling agent, in particular for producing jams, etc.]
Fabrikationsverfahren für ein Produkt zum Erhalt von Gelen, insbesondere für Nahrungsmittel und speziell für eine schnelle Herstellung von Marmeladen und andere Anwendungen, und mit diesem Verfahren hergestellte Produkte.
Charriere, R. T. (Unipectine SA)
West German Patent Application 1 922 513 (1970) [De]

A gelling agent of improved quality is produced by a simplified process. Sugar, sucrose, glucose or a similar substance having a crystal size of 0.6-0.8 mm is moistened with 0.4% water before mixing with 0.2-3.0% pectin. The mixture is subsequently dried at 60°C in a partial vacuum, and 0.4-0.8% crystallized acid, e.g. citric acid or tartaric acid, is added. Optionally, polyvalent cations, neutralizing salts, buffering agents etc. may also be added. The product is packed in moisture-proof bags and has an unlimited shelf-life. W&Co

1 T 61
[Thickeners.]
Toa Gosei Chemical Industry Co. Ltd.
Japanese Patent 14 865/70 (1970) [Ja]

Salts of polymethacrylic acid are employed as thickeners in foodstuffs. IFT

2 P 273
Fat containing milk powder.
Cavroy, P. G. P.; Rambaud, M. E. M
Cousin, C. M. J. E.; Savignac, G. G. E.
United States Patent 3 522 054 (1970) [En]

Mixtures of skim-milk concentrate (e.g. with 38g milk solids/100g), non-dairy fats and gum thickeners are homogenized, spray-dried and ground. The product is said to have improved fat distribution and solubility in water. The product is suitable for use in confectionery, instant breakfast foods and milk replacers for calf feeding. IFT

2 P 280
Milk gel composition.
Schuppner, H. R., Jr. (Kelco Co.)
United States Patent 3 507 664 (1970) [En]

A composition suitable for forming a milk gel composition comprises a finely divided, relatively homogeneous mixture of a tetra-alkali metal, pyrophosphate (1.5-3.5 g/pint milk), an edible calcium salt (1-5 g/pint) and a Xanthomonas hydrophilic colloid/locust bean gum mix (0.5-4 g/pint, 1:1 ratio). A gelled milk product is made by simply adding the above gelling composition to cold milk, agitating and refrigerating. HBr

2 R 58
[Correlation between melting point and gel strength of agar gel.]
Matsuhashi, T.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 16 (11) 520-21 (1969) [Ja, en] [St. Lab. of Food Tech., Nagano, Japan]

The correlation between mp and gel strength among grouped agars was highly significant when the agars were grouped by the manufacturing season at a certain factory. Application of the measurement of mp to quality control in agar manufacture is discussed. HE

2 T 90
[Regression line of "apparent gel strength" of agar gel on agar concentration. I.]
Matsuhashi, T.
Journal of Food Science and Technology (Tokyo) 17 (1) 29-32 (1970) [13 ref. Ja, en] [St. Lab. of Food Tech., Nagano, Japan]

The linear relationship between "apparent gel strength" (y) of agar gel and agar concn. (x) was investigated for 26 kinds of agar from various sources. The regression line of y on x was expressed by the following formula: $y = ax + b$. The significance of the coeff. a, the constant b, -b/a, and the estimated error of the regression line are discussed. [See also following abstr.] HE

2 T 91
[Regression line of "apparent gel strength" of agar gel on agar concentration. II.]
Matsuhashi, T.
Journal of Food Science and Technology (Tokyo) 17 (1) 32-34 (1970) [3 ref. Ja, en]

Factors which affect agar concn. of gels, and the related problems, are discussed in relation to "apparent gel strength". A method to obtain the so-called gel strength value, by calculation based on the measured values of the "apparent gel strength" of the industrial raw gels, was introduced. [See also preceding abstr.] HE

3 A 125
On power equations relating stress to shear rate in rheology.
Scott Blair, G. W.
Journal of Texture Studies 1 (4) 431-36 (1970) [26 ref. En] [Grist Cottage, Iffley, Oxford, UK]

A brief outline is given of the use history of power equations in rheology and dimensional difficulties are discussed. No complete explanation is yet available for the very wide application of these equations, but a few special cases (e.g. thickening of starch) are cited. Possible applications to texture studies are considered. AS

3 A 127
[Pectins.] Pektine. [A review]
Pilnik, W.; Zwiker, P.
Gordian 70 (5) 202-04; (6) 252-57; (7) 302-05; (8) 343-46 (1970) [157 ref. De, en] [Abteilung für Lebensmittelwissenschaft, Landwirtschaftliche Hochschule, Wageningen, The Netherlands]

A comprehensive review of the chemistry and properties of pectic substances in relation to their uses in the food industry is given. Aspects of pectin production and problems of analysis are also considered. Structure and differences in gelling properties of highly esterified and low-ester pectins are discussed in detail and used to explain different applications as gelling or stabilizing agents, for firming preserved or frozen fruit, for ice cream or as drying aids. RM

3 G 97
[Sake-flavoured jelly.]
Fukui, H.
Japanese Patent 19 624/70 (1970) [Ja]

Sake-lees are heated in a sealed plastics container, after which they are combined with granular sugar and a sugar-sweetened agar solution and moulded. IFT

3 J 172
Sweet pickle relish.
Walker, R. G. (Kraftco Corp.)
United States Patent 3 528 824 (1970) [En]

Sweet pickle particles in a relish mix are caused to collapse by osmotic pressure and heating. The particles are then suspended in a thickening agent and filled into portion controlled containers. After packaging, the thickening agent undergoes hydrolysis to reduce the viscosity while at the same time the collapsed pickle particles revert to their original size. IFT

3 L 194
Potato extractives: effect on firmness of pectin jellies and viscosity of potato starch pastes.
Zaehringer, M. V.; Cunningham, H. H.
Journal of Food Science 35 (4) 491-94 (1970) [18 ref. En] [Dept. of Home Economics Res., Univ., Agric. Expt. Sta., Moscow, Idaho 83843, USA]

Pectin jellies and potato starch pastes were prepared with aqueous extracts of potato tissue. All jellies containing potato extractives were weaker than distilled water control jellies. Jellies containing extractives from bud tissue were weaker than those containing extractives from stem tissue. Extractives from tubers stored continuously at 38°F weakened the jellies to a greater extent than those from tubers stored at 38°F and conditioned for 1 wk. Jellies containing extractives from boiled tissue were weaker than those prepared with extractives from blanched or steamed tissue. The most viscous pastes were those made with distilled water. In every case, viscosity of pastes containing extractives from raw tissue was less than half that of distilled water pastes. When extractives from blanched, steamed or boiled tissue were used, the viscosity decreased still further. The rigidity of jellies and the viscosity of pastes prepared with deionized extracts were similar to those of jellies and pastes prepared with distilled water. The data suggest that extractives leached from potato tissue increase sloughing of potato tissue during cooking by weakening the pectic materials in the intercellular cement rather than by enhancing the swelling of starch in the cells. AS

3 M 306
Instant wheat farina.
Hyldon, R. G. (Quaker Oats. Co.)
United States Patent 3 526 513 (1970) [En]

Denatured wheat farina is mixed with critical amounts of thickening agent and water, cooked on a drum drier, and comminuted. IFT

3 M 308
Flavoured instant grain.
Gralak, B. R.; Hyldon, R. G. (Quaker Oats Co.)
United States Patent 3 526 514 (1970) [En]

Denatured grain, such as corn, rice, barley or wheat, is mixed with critical amounts of thickening agents, water and a fruit composition, cooked on a drum drier and comminuted. IFT

3 M 358
Inactivation of cereal alpha-amylase by brief acidification: the pasting strength of wheat flour.
Meredith, P.
Cereal Chemistry 47 (5) 492-500 (1970) [39 ref. En] [Wheat Res. Inst., Dept. of Sci. and Ind. Res., Christchurch, New Zealand]

Acidification of a wheat flour slurry to pH 2.5 or below irreversibly inactivates flour α-amylase. Inactivation is complete in only a few minutes at room temp. Flour β-amylase is largely destroyed under the same conditions. A neutralized inactivated slurry is suitable for most thickening purposes but not for bread-baking. The acid-inactivation process may be incorporated in several analytical procedures. Inactivated flours vary in pasting strength measured by amylograph and in susceptibility to α-amylase attack. Flour α-amylase has survived storage for 60 yr at low temp. and for 10 yr at room temp. AS

3 T 101
Gelling agent.
Langen, A.; Thiele, H. (Pfeifer und Langen KG.)
Canadian Patent 849 460 (1970) [En]

The patent covers a gelling agent formed of sugar grains coated with pectin having a degree of esterification of 30-60% with or without citric acid and Ca salts. IFT

4 E 170
[Fried foods.] Gebratene Nahrungsmittel.
Laurens, R. (Rene Foods Inc.)
West German Patent Application 1 904 371 (1969) [De]

In order to avoid a second cooking of already cooked foods, such as chicken, shrimps and fish, for purposes of sterilization before vacuum packaging, a moisture-proof coating of edible high polymer such as agar-agar, acacia gum, gum from sea plants etc. is used. This coating should be applied when the food has a temp. ⩾60°C so that the pores are open; it should be applied in form of a watery solution which will become a gel. If the meat is to be dressed, the solution should be applied before dressing it so that subsequent heat sterilization in an evacuated can does not destroy the coating which preserves the moisture content in the meat. W&Co

4 G 139
[Gelled food production.]
Takanashi, K.
Japanese Patent 29 422/70 (1970) [Ja]

The patent covers a process of making a gelled food by gelling alginate, carrageenan, lower methoxyl pectin, singly or in combination in an aqueous solution containing acids or a polyvalent metal ion, previously incorporating a reversible material such as sodium citrate into the solution to control the reactive proportion of the gelling bath, and rapidly drying the product after gelling at a high temp. IFT

4 G 141
[Low-calorie spreads for sandwiches.] Verfahren zur Herstellung von für den Brotaufstrich geeigneten kalorienarmen Fettprodukten.
Moran, D. P. J. (Unilever NV)
West German Patent Application 1 492 954 (1970) [De]

A low-calorie soft fat spread with good keeping qualities is produced from 50-80% water-in-oil emulsion, to which an emulsifier and a thickener are added. Suitable emulsifiers are natural phosphatides, lecithin, etc., and water-soluble salts and esters of carboxymethyl cellulose, etc. are used as thickeners. A water-in-oil emulsion is produced which is cooled rapidly to ~15°C and left to allow crystallization of the fat which may be butterfat. W&Co

4 H 477
[Method for the production of a fruit-flavoured beverage.] Verfahren zur Herstellung eines Getränkes mit Fruchtgeschmack.
Glicksman, M.; Farkas, E. (General Foods Corp.)
West German Patent Application 1 517 034 (1969) [De]

A dry concentrate for the preparation of a beverage having a controlled viscosity and the appearance of a freshly prepared citrus juice drink, contains a thickener which consists of a granulated mixture of a gum which is water-soluble at 0-21°C and a gum which swells in water in the same temp. range. The thickener may also contain a dried emulsion of a homogenized plastic fat, coated with a water-soluble gum. W&Co

4 L 287
Studies on new starches. II. A study of the properties of four varieties of mucuna bean (Stizolobium).
Tolmasquim, E.; Correa, A. M. N.; Nakamura, T.
Stärke 22 (9) 313-17 (1970) [15 ref. En, de, fr] [Lab. de Amido, Inst. Nac. de Tech., Av. Venezuela, 82 Guana Bara, Brazil]

Starches of 4 varieties of mucuna bean (black, dwar, white and striate) were studied with a view to their possible technological utilization. Starch granules are rounded, of different sizes. Protein contents range from 0.10 to 0.14, ash 0.019 to 0.075, fat 0.20 to 0.24, P 0.0027 to 0.0031 (units not given). Iodine affinity of 5.17-5.77% indicated a low amylose content, the slow and progressive solubilization in dimethyl sulphoxide indicated restricted swelling and solubility, and similarity of Brabender viscosity curves to those of starches with artificially crossed linkages suggest a very homogeneous structure containing strong linking forces and a high degree of association inside the granules, which is useful for thickening agents. RM

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4 S 414
Gelled meat product.
Schuppner, H. R., Jr. (Kelco Co.)
Canadian Patent 855 650 (1970) [En]

A substantially homogeneous gelled meat-containing product comprises meat, water and a sufficient quantity of a Xanthomonas hydrophylic colloid and locust bean gum to form a firm, cohesive aqueous gel. IFT

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4 T 158
[Sweetener for foods and drinks.] Süssmittel für Nahrungsmittel und Getränke.
Hayashibara AG
West German Patent Application 1 903 075 (1969) [De]

The new sheetener is maltite' (maltitol). It does not crystallize out from foodstuffs, has no calorie value, is suitable for diabetics, as a humectant and thickening agent, tends to stabilize aroma and colorants, and is heat-stable without discoloration. W&Co

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5 G 161
[Coating compositions.]
Munakara, I.
Japanese Patent 21 607/70 (1970) [Ja]

Meat, fish and other foods to be frozen for storage are first coated with an aqueous solution of agar-agar, gelatin or alginic acid which has been blended with starch at a temp. below that at which starch cells are broken. IFT

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5 G 177
Soybean proteins: their functional, chemical, and physical properties. [A review]
Wolf, W. J.
Journal of Agricultural and Food Chemistry 18 (6) 969-76 (1970) [65 ref. En] [N. Regional Res. Lab., USDA, Peoria, Illinois 61604, USA]

Soybean proteins are available to the food industry in the form of flours and grits, concentrates, and isolates with respective protein content of 40-50, 70, and 90% or more. These proteins, when added to a variety of foods, supply desirable functional properties, such as emulsification, fat absorption, moisture holding, thickening, and foaming. Soybean proteins are mainly globulins with min. solubilities near pH 4.5 and consist of a mixture of components with mol. wt. ranging from 8000 to 600 000. 2 of the major components, the 7S and 11S globulins, form insoluble disulphide polymers, undergo association-disrupted by acids, alkalis, urea, detergents, and dissociation reactions, and have quaternary structures. The quaternary structures are heat. Conc. solutions of protein isolated increase in viscosity and gel when heated. Heating dil. solutions of 11S globulin causes about one-half of the protein to precipitate, while the other half is converted into a 3-4S form that remains soluble. AS

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5 G 189
[Method and device for manufacturing meat substitutes.] Verfahren und Vorrichtung zur Herstellung von fleischähnlichen Nahrungsmitteln.
Page, J. A.; Dechaine, R. C. (General Mills Inc.)
West German Patent Application 1 517 033 (1969) [De]

A pallatable protein-containing food product having a structure similar to that of meat is produced from fibrous material composed of proteins derived from soya beans, maize, peanuts, casein etc. The fibrous material is obtained by dispersing the protein in an alkaline solution, extruding it from a spinneret and coagulating the filaments in an acid bath. The obtained filaments are collected, drawn, cut, impregneted with various additives, e.g. colouring and flavourings, and then mixed with binders, e.g. vegetable gums, gelatin, pectin, skim-milk components and/or egg white. Animal and/or vegetable fats are added. Heat and pressure are applied to orientate the fibres to compact the mixture and to coagulate or gel the binder if required. The product is then dried to a moisture content of preferably 4-5%. W&Co

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5 J 631
[Process for producing a food product or fodder.] Nahrungs- bzw. Futtermittel und Verfahren zur Herstellung derselben.
Silbermann, H. C. (Philip Morris Inc.)
West German Patent Application 1 814 306 (1969) [De]

Dried lettuce, cabbage, carrots, oranges, grapes, apples, etc., containing pectins and/or hemicellulose and $\leqslant 50$ parts starch, $\leqslant 50$ parts protein, $\leqslant 10$ parts oily substance and $\leqslant 10$ parts inert or non-convertible carbohydrates (per part convertible carbohydrates), are mixed with 8-15 wt. parts water and 0.01-20.00 wt. % of an enzyme or enzyme mixture with hemicellulase and/or pectinase activity. The mixture is left for 15 min - 48 h at 3.5-6.0 pH and 20-80°C. Then it is made into a slurry by gentle agitation. The slurry is moulded or formed, e.g. into a web, bar, etc., and dried to 3-20 wt. % moisture content. The resulting product has good preservability and improved flavour. W&Co

5 M 548
[Cake preparation.]
Moringa General Mills Co. Ldt.
Japanese Patent 25 261/70 (1970) [Ja]

Method is described for manufacturing sponge cakes having topping compositions containing gelling agents such as carrageenan, gelatin or agar-agar. IFT

5 P 700
[Process for the continuous production of sweetened condensed milk.] Verfahren zur kontinuierlichen Herstellung von gezuckerter Kondensmilch.
Baumgartner, A. (Societe des Produits Nestle SA)
West German Patent Application 1 492 812 (1970) [De]

Standardized, whole milk is mixed with ~43% ground sugar, e.g. sucrose, and the mixture is pasteurized at 105-130°C. Then it is condensed in a 2-stage operation at ~77-83°C and ~43-48°C respectively to 75% TS. The product is immediately cooled to 25-30°C and homogenized, then cooled to ~20°C, again homogenized in a colloid mill and finally injected with lactose crystals and packaged. The product has improved stability and flavour, and exhibits no fat separation or age thickening after long storage. W&Co

5 P 716
A process for producing a packaged milk-based food.
Chambourcy SA
British Patent 1 218 280 (1971) [En]

Production of jellified milks comprising 2 separate portions of different colours and flavours in a single container is covered. They are made using 2 separate portions of milk by addition to each portion of thickening and stabilizing agents (carrageenan moss extracts together with galactans and starchy materials) and sodium salts of the sulphate and phosphate type to control the setting rate. The separate portions, still in the liquid state, are then poured into 2 separate compartments formed by partitioning the container to prevent mixing. After setting, the partition is removed. Different flavourings and/or colouring agents may be added to the 2 portions. FL

5 T 241
[Binding and thickening agents: use in deep-frozen ready-prepared meals and similar items.] Binde- und Verdickungsmittel: Anwendung bei tiefgefrorenen Fertiggerichten und verwandten Zubreitungen.
Völker, H. H.
Ernährungswirtschaft 17 (2) 64, 66 & 73-74 (1970) [3 ref. De]

Binding and thickening agents used in the preparation of ordinary foods are generally inadequate for ready-prepared frozen meals. After an outline of the development of suitable agents and of the colloidal chemistry involved, results of tests carried out to determine the suitability of such agents for freezing are given, and 2 methods for testing the freezing/thawing properties of starches are described and their application to various binding agents is outlined. IN

5 T 270
Seaweed extract role is major in frozen pies, puddings, dinners, sauces, drinks.
Claus, G.
Quick Frozen Foods 32 (7) 42-43 & 171-72 (1970) [En] [Offshore/Development Corp., New York, USA]

The use of the phyco-colloids, alginic acid, carrageenan and agar-agar, isolated from brown or red algae, in frozen foods, to prevent separation of liquid after thawing is generally discussed. Other applications for seaweed are also mentioned. PEG

6 G 200
[Process for producing portions of a composite material.] Verfahren zur Herstellung von Portionen eines mehrteiligen Materials.
Spek, P. J. (Unilever NV)
West German Patent Application 1 586 319 (1970) [De]

A substance consisting of a liquid phase and solid particles, e.g. soups, is mixed with a thickener for homogeneous distribution in packaging. To obtain a clear product, an enzyme, e.g. α-amylase, is admixed after packaging to react with the thickener, e.g. starch. This enzyme is then inactivated during sterilization. W&Co

6 G 213
Food colloid replaces fats, starches; reduces calorie content as much as 90%.
Anon.
Food Processing 31 (9) 32 (1970) [En]

A water-soluble, hydrophilic vegetable colloid processed from modified algins, polyphosphates, citric acid, sodium citrate and modified starches, is easily dispersed in foods by dry blending, and can be used to replace large quantities of starches and fats in calorie-reduced foods. The blend (Calorex) is available with a normal pH for desserts, and with a low pH for salad dressings, and as a stabilizer formula for beverages. As well as thickening the food, creaminess and a heavier body are also obtained. Calorie reductions of ⩾50% are possible; textural stability and resistance to acids, heating, freezing and shear are good. PEG

6 J 734
[Influence of the polyphenols of blackcurrants on the activity of pectolytic enzymes and the viscosity of pectin solutions.] Einfluss der Polyphenols von schwarzen Johannisbeeren auf die Wirksamkeit von pektinspaltenden Fermenten und die Viskosität von Pektinlösungen.
Wucherpfenning, K.; Millies, K. D.; Landgraf, H.
Flüssiges Obst 37 (3) 87-97 (1970) [5 ref. De]
[Inst. für Weinchemie und Getränkeforschung der Hessischen Lehr- und Forschungsanstalt für Wein-, Obst- und Gartenbau, Geisenheim (Rheingau), W. Germany.]

Viscosity of pectin solutions was measured at 5 min intervals under standardized conditions with and without pectolytic enzyme preparations and with and without addition of conc. polyphenols by the method of Schubert [Brauereirundschau (1951) 62: 31] using a flow through viscometer. The viscosity of pectin solutions increased when polyphenol concentrate was added. Ca content of the polyphenol concentrate (28 mg/l.) did not influence the viscosity of the pectin solutions. Phenolase and phenoloxidase showed no influence on the breakdown of pectins in solutions which contained small amounts of blackcurrant juice. Possible inhibition of pectin breakdown by mono- or polymerized or oxidized polyphenols was tested with polyphenoloxidase with and without ascorbic acid; no influence was found. In apples with heavy browning, initial viscosity was increased, but the speed of pectin break-down was comparatively high. The pH had no influence. The complex of polyphenols and pectin was shown to develop slowly at 40°C; breakdown of pectin in solutions containing these complexes was difficult and the resulting viscosity at the end of the process was always comparatively high. The complex formation is likely to occur more rapidly in long stored or infected fruit, where autolysis has begun. JMS

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6 P 860
Stabilization of evaporated milk.
Allied Chemical Corp.
British Patent 1 177 427 (1970) [En]

Sterile conc. milk can be stabilized against age-thickening by the addition, immediately before aseptic canning, of sodium, potassium and/or ammonium polyphosphates in the range of 0.02-0.10% of the wt. of milk solids. The polyphosphates are added in sterile aqueous solution; the sterilization may be by suitable filtration, but not by heat. JMD

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6 P 913
Milk-based puddings and custards could open profitable new markets for dairies.
Emmons, D. B.; Larmond, E.; Beckett, D. C.
Modern Dairy 49 (3) 17-21 (1970) [8 ref. En] [Food Res. Inst., Dept. of Agric., Ottawa, Canada]

Developments in the field of "ready-to-eat" non-sterile dairy puddings in Canada are discussed. 5 formulations based on partially-skimmed (2% fat) milk were evaluated; 2 contained 4.5-5 lb starch/100 lb milk, 2 contained 3.5 lb starch/100 lb milk + stabilizer (carrageenan-based), and 1 contained only gelatin as thickening or gelling agent; all contained 10 lb sugar and 0.025 lb salt/100 lb milk and were vanilla flavoured and either white or yellow. All formulations were highly acceptable to a panel of 20 tasters, but 18 preferred a coloured to an uncoloured pudding. The product made with 5% modified starch could be stored at 4.5°C for up to 5 wk. A wide range of flavours were also tested and those most acceptable were maple, chocolate, butterscotch, lemon and fruit salad. Advantages of non-sterile milk puddings over sterilized products are claimed to be a superior flavour, a possibility of extending the range of flavours beyond those possible in sterilized products, and a lower cost of production equipment; the main disadvantage is the limited shelf-life. CDA

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6 P 941
[Process for producing storable whipped fat emulsions.] Verfahren zur Herstellung von haltbaren geschlagenen Fettemulsionen.
Schulz, M. E.; Beyerlein, U.
West German Patent Application 1 900 488 (1970) [De]

A 10-50% fat emulsion, containing casein, is mixed with gelling or thickening agents, e.g. carrageenan, agar-agar etc., and vegetable hydrocolloids in such small quantities that the viscosity of the emulsion is ⩽50 cP at 5-10°C. The mixture is then sterilized by ultra-high temp. heating, and cooled. At <10°C, a sterile solution of milk-coagulating enzymes, e.g. rennet, is admixed, and the whole is whipped by introduction of sterile air, N_2 or CO_2, and packaged. During subsequent storage at >10°C, the coagulation effect of the enzymes and the gelling process render the product firm. It may be stored for months at low temp. The process is suitable for whipped, real, or imitation cream. W&Co

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6 P 945
[Biological production process for animal and dairy food products.] Verfahren zur biologischen Herstellung von Lebensmitteln der tierischen- und Milchprodukte.
Trinkl, A.
West German Patent Application 1 903 304 (1970) [De]

Colloidal linseed preparation, preferably pulverized and pre-cooked, is added to products, in particular dairy products, in amounts sufficient to result in thickening. W&Co

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6 P 917
[Milk product with increased volume.] Milchprodukt mit vermehrtem Volumen.
Compagnie Gervais-Danone
West German Patent Application 1 949 650 (1970) [De]

A milk product is produced by mixing milk, cream, sugar, flavouring, colouring, etc., increasing the vol. by 40-100% by injecting an inert gas, e.g. N_2, Ar, and cooling. The fat content is 10-50% in DM and the TS content ∼30-50%. The product also contains a stabilizer, e.g. 0.1-1.0% gelatin, to prevent syneresis and other stabilizer(s), e.g. 0.2-1.0% of a vegetable gum, a pectin and/or an algal extract, to maintain the product structure, and starch product(s), e.g. 0.2-3.0% cereal or potato starch. The product may be refrozen several times and has improved storage life. W&Co

6 P 995
[Dairy products and process for their manufacture.] Molkereiprodukte und Verfahren zu deren Herstellung.
Little, L. L. (Battelle Development Corp.)
West German Patent Application 1 492 766 (1969) [De]

0.05-1.0% stabilizer is mixed with milk and a sufficient quantity of an edible acid immediately stirred in at 1.5-43°C to achieve pH 3.7-5.0. In an example of application to the production of non-cultured buttermilk, 0.227 kg salt, 0.023 kg agar, 0.023 kg locust bean gum and 0.091 kg gelatin are mixed together and gradually dispersed in 45.4 kg raw skim-milk. The mixture is then pasteurized at 62-96°C and cooled to ≤4.5°C and rennet distillate preparation and citric acid are added during vigorous stirring. As soon as the acid has been thoroughly mixed with the milk, 'flakes' can be produced by vigorous shaking. The product is then bottled and cooled. W&Co

6 T 317
Hydroxystearic acid deposition and metabolism in rats fed hydrogenated castor oil.
Binder, R. G.; Booth, A. N.; Robbins, D. J.; Fuller, G.
Lipids 5 (10) 832-37 (1970) [30 ref. En] [W. Regional Res. Lab., Albany, California 94710, USA]

The effects of ingestion of hydrogenated castor oil on the growth and tissue lipid composition of rats was studied. Hydrogenated castor oil and the principal constituent, hydroxystearic acid and its derivatives are being tested for use as emulsifiers, thickeners and antistaling agents for food products so it is necessary to determine the effects of its ingestion. Groups of rats were fed diets containing corn oil, 1% or 10% hydrogenated castor oil (no toxic effects were demonstrated in a prior study which offered diets containing up to 20% hydrogenated castor oil). Max. content of hydroxystearic acid was 4.4% (in adipose tissue) in rats fed for 4 wk on the 10% hydrogenated castor oil diet. No adverse effects (as indicated by organ wt. and results of haematological and microscopical pathological examinations) were observed except a reduced growth in rats given 10% hydrogenated castor oil. This was ascribed to its low digestibility (estimated as 9-14%) due to a comparatively high mp (87°C). LTH

6 U 345
Current food additives legislation - Belgium.
Food & Agriculture Organization
Current Food Additives Legislation 1969 (124) 2 (1969) [En] [Rome, Italy]

Ministerial Orders of 20th May 1968 and t8h Aug. 1968 issue miscellaneous amendments concerning additives to beer, under the following headings: Thickeners, gelling agents, stabilizers - authorization for use in beer of alginic acid and its Na, K and Ca salts is removed and replaced by alginic ester of propylene glycol either alone (max., 100 mg/l.) or in combination with ferrous sulphate; Solvents, fillers, diluents - insertion of an additional use of propylene glycol, viz. in beer (max., 150 mg/l.) as a result solely of use of octyl gallate dissolved in the additive. AB

6 U 366
Current food additives legislation -South Africa.
Food & Agriculture Organization
Current Food Additives Legislation 1968 (120) 11-12 (1968) [En] [Rome, Italy]

Government Notice No.R.1520, of 30 Aug. 1968, concerns "Regulations in regard to cider, perry, apple fermented beverage, pear fermented beverage, and orange fermented beverage". Regulation 5 provides that any one or more of the following substances may be added to the above-mentioned beverages (designated as "other fermented beverages") either before, during or after the manufacture thereof; yeasts or harmless yeast nutrients; tartaric, citric ro malic acid; CO_2; activated charcoal; SO_2 or metabisulphite of Na or K - provided that no "other fermented beverage" shall contain SO_2 in excess of 200 mg (of which not more than 50 mg may be in the form of free SO_2)/l. of such beverage; L-ascorbic acid; gelatin, tannin, casein, egg albumen, agar-agar, bentonite, filtering asbestos or activated clay; enzymes; carbonate of Ca, Na or K; caramel; citrates or malates of Ca, Na, or K; anion or cation exchange resins. AB

6 U 377
Current food additives legislation - Yugoslavia.
Food & Agriculture Organization
Current Food Additives Legislation 1968 (120) 14 (1968) [En] [Rome, Italy]

The Regulation of 3 April 1968 supplements that of 16 May 1963 concerning the quality standards of coffee, coffee substitutes, tea, spices, soup concentrates, bakers' yeast, baking and pudding powders, dietetic foods and food additives. Article 86, relating to "Additives to pudding powders" states that in addition to small amounts of pectin, gelatin, alginates and agar-agar previously authorized, the following stabilizers may be incorporated: disodium orthophosphate (max.: 0.3%) and tetrasodium pyrophosphate (max.: 0.6%) calculated on the finished pudding. The 2 new additives are subject to the same purity requirements as the 4 already covered. Article 115, "Synthetic organic colouring matters" now includes Patent Blue V (C. I. No. 42051, Schultz No. 826). AB

6 U 381
Current food additives legislation - Canada.
Food & Agriculture Organization
Current Food Additives Legislation 1970 (132) 1-9 (1970) [En] [Rome, Italy]

Amendment of 15th May 1968 to the Food and Dru Regulations (SOR/68-190) is given. A revised list of additives that may be used as class IV preservatives, foods they are permitted in or on and max. level of use are tabulated. These include: ascorbic acid, ascorbyl palminate, BHA, BHT, citric acid, gum guaiacum, lecithin, lecithin citrate, monoglyceride citrate, monoisopropyl citrate, propyl fallate, tartaric acid and vegetable oils containing tocopherols. Revisions made to: the list of anticaking agents; bleaching, maturing and dough conditioning agents; emulsifying, gelling, stabilizing and thickening agents and food enzymes, are noted. VJG

6 U 394
Current food additives legislation - Mexico.
Food & Agriculture Organization
Current Food Additives Legislation 1969 (125) 3 (1969) [En] [Rome, Italy]

Official quality standard for mayonnaise, of Dec. 1967, authorizes use of monosodium glutamate, and of vinegar as pH adjuster. Mayonnaise may be manufactured and packaged in the presence of N_2 and CO_2. Use of artificial flavourings, egg substitutes, emulsifiers and thickeners is prohibited. AB

6 U 426
Current food additives legislation - Mexico.
Food & Agriculture Organization
Current Food Additives Legislation 1969 (125) 4-5 (1969) [En] [Rome, Italy]

Official quality standards for fruit preserves, (orange marmalade, peach jam, quince jelly, pineapple jelly and mango jelly) authorize addition of pectin as a gelling agent; citric, lactic, tartaric or malic acid, alone or in combination as pH adjusters; sodium benzoate (max., 0.1% by wt. as benzoic acid in the finished product), sorbic acid or its Na or K salts (max., 0.2% by wt. as sorbic acid in the finished product) and SO_2 (max., 40 ppm in the finished product) as preservative agents; ascorbic acid as antioxidant; sodium citrate and/or potassium citrate (max., 0.2%); and colorants authorized by the Secretariat of Health and Welfare (label statement required). Artificial sweeteners and flavourings are prohibited. Pesticide residues are tolerated in accordance with levels established by the Secretariat. AB

6 U 428
Current food additives legislation - Namibia.
Food & Agriculture Organization
Current Food Additives Legislation 1969 (123) 1-14 (1969) [En] [Rome, Italy]

Details are given of the Regulations relating to the Standards of Food, Drugs & Disinfectants, 1968, which deal with food additives or contaminants under the following headings: Labelling; Prohibition of unwholesome or poisonous substances in food; Prohibition of articles, devices or appliances used for purposes of adulteration; Preservatives in food; Colouring, flavouring, thickening and artifical sweetening substances in food; Cream; Butter, margarine and ghee; Cheese; Cereals; Baking powder and other leavening substances; Meat and fish preparations - edible fats and edible oils and mineral oils; Mineral oil; Cocoa and chocolate; Custard powder and pudding powder; Curry powder, borrie compound and chilli powder; Ginger; Mustard; Pepper; Cloves and other spices; Sauces and chutneys; Jam, conserve, marmalade, fruit-jelly etc.; Sugar, confectionery, dextrose and icing sugar; Fruit juices, diluted, sweetened and diluted, conc., fruit purees and fruit nectars; Fruit syrups, cordials, crushes and squashes; Flavoured beverages or drinks; Aerated or mineral waters; Labelling of flavouring ingredients; Vegetable juices; Preservatives to be used by inspectors; Chewing gum; Vitamins; Honey; Salt; Vinegar; Fungus-produced toxins. [See FSTA (1969) 1 11D618.] AB

7 L 545
Continuous filtration process for first carbonation juice in cane sugar factory.
Wei Chen; Hsu, A. H.; Tsai, M. T.
Sugar Journal 33 (7) 9-13 (1970) [5 ref. En] [Sugar Experimental Sta., Tainan, Taiwan.]

Operation of an endless belted rotary drum filter for first carbonation cane juice is described and analytical data for the cake and juice obtained are compared with figures for a conventional filter press. The importance of thickening with the aid of coagulants prior to filtration is stressed. Thickening in Bach (i) and Deming (ii) subsiders was compared. (i) was satisfactory for operation up to 100-140 h., after which it became sluggish, but (ii) was generally superior and produced a rapid flow from filter. It is claimed that rapid thickening and filtration reduce decomposition of invert sugar to coloured compounds. WHCA

7 L 555
"Genu"- A new pectin for jelly fruits.
Perry, F.
Confectionery Production 37 (3) 135-36 & 173 (1971) [En]

The difficulties in using pectin as opposed to agar-agar jelly production are discussed, and recipes and processing instructions based on the use of "Genu" pectin (citrus type), type D, slow gelling, 150° USA-SAG confectionery grade are given as a guide to manufacturers. This type of pectin is said to have properties particularly suited to confectionery fruit jelly work. These are a delayed action effect which allows time for the operation of filling machines, and rapid gelling after depositing. BFMIRA

7 L 582
[Process for producing miscible starch based esters.] Verfahren zur Herstellung von Stärkemischestern oder Stärkeätherestern.
Tuschhoff, J. V.; Smith, C. E. (A. E. Staley Manufacturing Co.)
West German Patent Application 1 296 382 (1969) [De]

Cereal starch is suspended in H_2O or a polar solvent, and reacted with $\geqslant$1 polyvalent etherification and/or a polyvalent esterification agent. Suitable agents, of which 0.01-10.00 wt.% are used, are $POCl_3$, acrolein, epichlorohydrin, etc. Reaction is continued until the resulting cross-linked starch derivative has a 50-90 ccm fluidity. In a 2nd stage, the derivative is acylated at an alkaline pH with 1.0-40.0 wt.% of the vinyl ester or anhydride of an aliphatic monocarbonic acid with 1-18 C-atoms. The 2 process stages can be effected in reverse order. If required, additional cross-linking is effected at pH $<$4 with the acetaldehyde formed during acylation. The resulting product is isolated. It is used as a thickener in pie- and cake-fillings, etc. W&Co

7 P 1159
Process for the production of foods.
Reinders, M. A.; Gotlieb, K. F. (Co-operatieve Verkoop- & Productievereniging van Aardappelmeel & Derivaten 'AVEBE' GA)
British Patent 1 220 694 (1971) [En]

Milk custards or puddings are made by heating to 110-150°C a mixture of milk, sugar, a starch-type thickening agent and flavourings ± a gelling agent, cooling the sterilized product to ~60°C and packaging it aseptically. For the production of viscous dairy products intended for prolonged storage, amylopectin derivatives which have been treated with both a polyfunctional reagent and a monofunctional esterifying or etherifying reagent (e.g. vinyl acetate) are suitable. 3 examples, including the quantities of the ingredients used, are given for the manufacture of milk custards and puddings by UHT process with direct or indirect heating followed by aseptic packaging. It is claimed that the products can be stored for a very long time without adverse effects on their structure and viscosity. FL

7 P 1160
[Frozen confection.]
Kanegafuchi Spinning Co. Ltd.
Japanese Patent 33 745/70 (1970) [Ja]

An agar syrup containing sorbitol and fructose or propylene glycol and mannitol is coagulated at room temp., mixed with ice cream and rapidly frozen at -30°C. IFT

7 P 1220
Process for the production of foods.
Reinders, M. A.; Gotlieb, K. F. (Cooperatieve Verkoop- & Productievereni ging van Aardappelmeel & Derivaten 'AVEBE' GA)
British Patent 1 220 838 (1971) [En]

A continuous process for the production of foods, e.g. custard cream and pudding, comprises heating the ingredients, including a thickening agent, at 110-150°C in a UHT sterilizer with direct or indirect heating, cooling to ~60°C and aseptic bottling or cartoning. The thickening agent is a starch derivative obtained by treating natural starch containing $\geqslant$90% amylopectin with polyfunctional reagent capable of cross-linking starch, with or without treatment with a monofunctional esterifying or etherifying reagent. The thickening agent is in the dry state before being mixed with the other ingredients. 3 examples of application to the production of custards and puddings are given. FL

7 P 1228
[Yoghurt production.]
Meiji Products Co. Ltd.
Japanese Patent 36 142/70 (1970) [Ja]

Milk containing agar fermented with lactic acid-forming bacteria at a 1st temp. higher than the agar-gelatinization temp. and then at a 2nd temp. lower than it. IFT

7 T 345
Food thickeners.
Cerebos Foods Ltd.

British Patent 1 215 465 (1970) [En]

Dry bases for products such as gravies are based upon compositions containing hydrophilic colloids and non-gelatinized starch to provide rapid dispersion and thickening without formation of lumps. IFT

7 T 346
Gelling compositions.
Horn, L. J. (Kraftco Corp.)
United States Patent 3 563 769 (1971) [En]

Artifically sweetened food products are gelled by incorporation of mixtures of polysacharide gums extracted from seaweed and high methoxyl pectin. IFT

8 H 1209
Bound water in fruit products by the freezing method.
Moy, J. H.; Chan, K.-C.; Dollar, A. M.
Journal of Food Science 36 (3) 498-99 (1971) [6 ref. En] [Dept. of Food Sci. & Tech., Univ., Honolulu, Hawaii 96822, USA]

An insulated heat-sink container Freon-12 (bp -21.6°F) provides a reproducible system for measurement of thermal properties of fruit products. The difference in time required to remove the latent heat of fusion of the eutectic mixture in comparison wtih distilled water measures the bound water. The 34-37% bound water in papaya (var. solo) pulp is unaffected by varying pH in the range 3.0-6.0. $<$10% water is

bound in guava, passion fruit and pineapple juice products with up to 35% sucrose added. Thermal conductivity of the solid phase eutectic mixture in the 5-50% soluble solids range fits the regression = AB^x, $Y = (3.69)(0.96)^x$ where x = % total soluble solids (TSS) and Y = thermal conductivity (cal × 10^3/(cm^2) (sec) (°C/cm)). The relationship of fp to TSS values as 1.10 ± 0.64 (TSS) in the test system is significant ($P<0.01$) in the range 5-50% TSS. The time for fusion (ϑ_{w63}) of sucrose/water in the range 5-50% TSS fits the regression: $\log \vartheta_{w63} = (-0.8325)(-0.0165)$ (TS
GELATION WITHOUT AFFECTING bound water values.
Pectin gel structures apparently are dependent on secondary bonding and independent of bound water per se. AS

8 J 1069
[Apple product.]
Watanabe Seika Co. Ltd.
Japanese Patent 38 504/70 (1970) [Ja]

Solid materials remaining after apple squeezing are combined with agar-agar, gelatin, pectin and formed into cakes. IFT

8 L 623
[Refined starches for food manufacture.]
Kodet, J.
Prumysl Potravin 22 (1) 19-24 (1971) [8 ref. Cs]

Re-gelled potato, wheat and maize starches are manufactured in Czechoslovakia by application of aqueous suspensions to rollers heated at 130-150°C for drying and granulating. This method is said to be less complex and more economical than methods used abroad. The "roller method" can also be used for drying sugar, cocoa, milk, soya protein etc. Starches are used in the Czechoslovak food industry as thickening agents in ready meals, fruit and vegetable spreads and fruit fillings in confectionery (in the latter because of stable consistency of the filling during baking); amylose, which has good digestibility and solubility in hot water can be used as a firm, transport film-coating of food products. Amylopectin, which originally considered to be an unpleasant by-product of starch fractionation, can also be used as a thickening, stabilising and water-binding agent which is dispersible in cold water, has high viscosity and resistance, and is suitable for inclusion in the manufacture of instant mixes in the canning and confectionery industries. Chemical structure of starches and viscosity graphs are presented. OA

8 M 895
[Single-step process for production of sponge mixes not containing emulsifiers.] Einstufiges Verfahren zur Herstellung von emulgatorfreien Biskuitmassen.
Kuchinke, E.; Buchta, K.; Lamprecht, F. (C. H. Boehringer Sohn)
West German Patent Application 1 302 451 1970)
[De]

Flour or another dough mix component e.g. starch, dried, etc., is admixed with 0.1-0.8% (in terms of total dough material) of a cold-setting starch, alginate, carrageenan, agar-agar, carob bean meal or pectin. The dough obtained on adding the remaining constituents has low viscosity and vol. During baking, it expands to the same vol. as conventional dough. Flavour is improved due to lack of emulsifiers. W&Co

8 T 404
[Concentrating agents for frozen sauces.]
Brunnek, N. I.; Koptelova, E. K.
Konservnaya i Ovoshchesushil'naya Promyshlennost' 1970 (11) 36-37 (1970) [Ru] [Nauchno-issled. Inst. Torgovli i Obshchestvennogo Pitaniya Ministerstva Torgovli SSSR, USSR]

When freezing and storing frozen sauces at low temp. their homogenous character often deteriorates and changes occur in their consistency and appearance. Wheat flour is used as the main thickening agent for frozen sauces. The properties of its starch change with heating. Starch made from wax maize and also modified starches were tried. Experimental tests proved that rice starch was unsuitable for the purpose. Amylopectinic maize starch withstood the effects of heat, but at lower temp. liquid phase separation caused deterioration in the consistency of the sauce. Phosphate maize starch, heated to 160°C for 30 min. did not change its quality either during freezing or thawing or during the heating process. This modified starch was used as a thickening agent for milk and cream based sauces. An addition of approx. 3.5% of starch was required to give the sauce a normal consistency. Sauces of the required consistency, stored at 18°C for period of 9 months, did not change and retained their original organoleptic properties. Modified starch as a thickening agent simplifies production and partly reduces production costs. STI

8 U 557
Current food additives legislation - Belgium.
Food & Agriculture Organization
Current Food Additives Legislation 1970 (136) 8-10
(1970) [En] [Rome, Italy]

Ministerial Decisions of 6 Feb., 1970 authorize the use of certain additives in foodstuffs. Additives which may be used in extracts and aromatic essences and preparations are listed (together with max. permitted level) under the general groupings: antioxidants, preservatives, emulsifiers, thickeners, gelling agents, stabilizers, organic acids, acids, bases and mineral salts, artificial sweeteners, taste enhancers, alkaloids, solvents, fillers, diluents and antifoaming agents. VJG

8 U 575
Current food additives legislation - Belgium.
Food & Agriculture Organization
Current Food Additives Legislation 1970 (136) 6 (1970) [En] [Rome, Italy]

Ministerial Decisions of 27 and 28 March, 1969 authorizing the use of additives in foodstuffs, amends the list of permitted additives as follows: antioxidants - use of L-ascorbic acid at 50 mg/kg is extended to wheat flour; preservatives now authorized are: nisin (max. 2.5 mg/kg in cheese), 250 mg/kg of one or more of SO_2, benzoic acid and sorbic acid in mustard, max 1.2% benzoic acid and salts in brine for diluting rennet-pepsin mixture for cheese curdling, mat. 0.1% sorbic acid and salts in gingerbread and max. 70 mg/kg expressed as SO_2 in rolled dough biscuits; emulsifiers - permits max. 1.5% of mono and diglycerides to be added to food pastes subjected to heat treatment in containers; thickeners - use of 10 kinds of thickeners is extended to biscuits, zwieback, pastry products, gingerbread; and surface coating substances and glazes (beeswax may be used on gingerbread). VJG

9 A 405
Pectin research in the sixties. [A review]
Voragen, A. G. J.; Pilnik, W.
Deutsche Lebensmittel-Rundschau 66 (10) 325-29 (1970) [123 ref. En] [Dept. of Food Sci., Agric. Univ., Wageningen, The Netherlands]

The most important research on pectic substances and pectic enzymes during the past 10 yr is reviewed under the following headings: molecular structure of pectin, properties of pectin, biosynthesis of pectin, manufacture of pectin, use and application of pectin (e.g. in jams, jellies), analysis of pectin, saponifying enzymes, depolymerizing enzymes, use of pectic enzymes (e.g. in fruit juices) and expectations for the seventies. JA

9 G 302
[Dietetic mayonnaise.] Diätmayonnaise.
Weidemann, H.; Reinicke, H. P.
West German Patent Application 1 924 465 (1970) [De]

The mayonnaise consists of 15-35% oil, 6-10% egg yolk, 5-10% denatured milk protein, 1-2% sugar substitute or sugar, $\leqslant$1.5% salt, 2-4% mustard, 0.5-2.0% stabilizer, and sufficient acid to adjust the pH to $\leqslant$4.0, the balance being water and seasoning. Suitable oils contain fatty acids with long or medium chains. Pectins, alginates, gelatin, agar-agar etc. are used as stabilizers, and low-fat curd ts milk protein. The mayonnaise is produced by mixing and agitating egg yolk, oil and edible acids, and dissolving all remaining constituents in water. The 2 phases are then mixed, homogenized, packaged and preserved by heat-treatment, e.g. pasteurization at 95°C for $\sim$40 min. The mayonnaise has a low oil content and a shelf life of $\geqslant$6 months. W&Co

9 M 1015
Instant wheat cereal.
Quaker Oats Co.
British Patent 1 211 833 (1970) [En]

Wheat farina is denatured with steam, mixed with a polysaccharide gum thickener, and dried on a heated drum. IFT

9 P 1549
[A new problem-free buttermilk drink.]
Hansen, R.
Nordisk Mejeri-Tidsskrift 36 (12) 269-70 (1970) [Da]

The author discusses the prospects of marketing a pasteurized milk drink, on the lines of that developed in the Schleswig butter factory, W. Germany, based on buttermilk supplemented by lemon syrup, glucose and thickening agent. Preliminary experiments suggest a storage life of $\geqslant$14 days for such a product if kept in a refrigerator. GTP

9 T 461
[Separation of agarose and agaropectin from agar.]
Hayashi, K.; Hiramitsu, T.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 17 (12) 575-80 (1970) [18 ref. Ja, en] [Fac. of Agric., Univ., Kakamigahara, Gifu, Japan]

Agar was prepared from the seaweeds, Gelidium amansii, Gelidium japonicum, Ceramium boydenii and Gracilaria verrucosa, and agarose and agaropectin separated by the methods of acetylation, sodium iodide and dimethylsulphoxide. The ratio of agarose and agaropectin varied with the kind of seaweed employed, and the method of preparation and separation. The contents of D-galactose and 3,6-anhydro-D-galactose in agarose were 49-50% and 44-54% respectively. The IR spectra of agar, agarose and agaropectin were almost the same. HE

9 T 462
Dessert gels.
Moirano, A. L. (Marine Colloids Inc.)
United States Patent 3 556 810 (1971) [En]

An improved gelling agent for an aqueous dessert gel is provided by employing in combination: calcium-reactive low methoxyl pectin; locust bean gum; potassium-sensitive gum selected from the group consisting of potassium-sensitive carrageenan and furcellaran; and calcium-sensitive carrageenan. IFT

9 T 473
Alsberg-Schoch award lecture: starch and polysaccharide derivatives in the food and non-food industries. [A lecture]
Whistler, R. L.
Cereal Science Today 16 (2) 54-59 & 73 (1971) [En] [Purdue Univ., Lafayette, Indiana 47907, USA]

General characteristics of polysaccharides which make them useful to the food industry are first outlined. A description is given of the properties and structural characteristics of: guaran, hydroxyalkylcellulose, methylcellulose, pectin, algin, carboxymethylpolysaccharides, celluronic acid, sulphated polysaccharides and phosphated polysaccharides. VJG

9 U 622
Current food additives legislation - Italy.
Food & Agriculture Organization
Current Food Additives Legislation 1970 (137) 7 (1970) [En] [Rome, Italy]

Ministerial Decree of 12 Aug., 1969 updates the Ministerial Decree of 31 Mar., 1965 on the control of chemical additives authorized in the preparation and preservation of foodstuffs. Max. level of incorporation of ascorbic acid, sodium sorbate, potassium sorbate, calcium sorbate and SO_2 in fruit conserves in syrup is raised from 200 to 1000 mg/kg finished product. A 0.2% limitation on sodium sulphite, sodium bisulphite, sodium metabisulphite, potassium metabisulphite, calcium metabisulphite has been applied to vegetable products for preparation in brine or for canning plain. Max. levels of incorporation of the following gelling agents and thickeners are: medium-methoxyl pectin, 0.076%; low-methoxyl pectin, 0.1%; and carob bean flour, 0.5%. VJG

10 A 432
Functional evaluation of protein in food systems.
Briskey, E. J.
Wenner-Gren Center International Symposium Series 14: 303-312 (1970) [47 ref. En] [Univ., Madison, Wisconsin, USA]

In this paper, presented at the International Symposium on Evaluation of Novel Protein Products held at Stockholm in Sept. 1968, it is emphasized that if novel protein isolates are to be incorporated in foods much more information about their functional properties is required. Methods which could be used to evaluate protein isolates for some parameters of functionality are discussed under the headings: Emulsification; Water-binding; Gelation; Viscosity-dispersions; Thickening and dough-forming; Cohesion-adhesion; and Foamability AB

10 G 372
Improved freeze-thaw stability.
Yoder, D. J.; Bugg, M. W. (General Foods Corp.)
United States Patent 3 554 764 (1971) [En]

Food products having improved freeze-thaw stability are prepared from thickening mixtures containing pre-gelatinized wheat flour and/or starches, an edible gum and sodium stearyl fumarate. IFT

10 P 1706
The 1st part of this book is a general
New dairy products - some recent developments in sterilized canned desserts.
Keogh, M. K.
Farm and Food Research 1 (5) 105-06 (1970) [En]

The manufacture of 2 in-can sterilized desserts, creamed rice and custards, is described. Short grained rice which releases starch on cooking should be used for creamed rice, homogenizing the milk further improving the product. A chemically modified starch imparts texture and body to custards and carrageenan helps to prevent liquid separation. Plain cans are used for creamed rice and lacquered for custards. Gradual heating up periods and agitation are used during autoclaving to prevent localized overheating. Seasonal variation of milk composition is a problem; heating times must be decreased and stabilizing salts added during the January-March period. Browning and age thickening may occur but a shelf-life of 12 months is expected. GECV

10 P 1709
[Method of making frozen confectionery.]
Callens, C. M. L. H. G.
French Patent 1 583 990 (1969) [Fr]

Conventional ingredients are formed into a stable emulsion, at -4° to +4°C by an inert gas, e.g. N_2. A stabilizer may be added, e.g. sodium alginate, carboxymethylcellulose, methylcellulose, gelatin, agar-agar, carob gum, or a mixture of these. An emulsifier, e.g. lecithin monostearate, may be used. The emulsion is frozen to -10 to -30°C. In an example the ingredients liquid milk, cream, dried milk, sugar, glucose + stabilizers are brought to 65°C, homogenized, pasteurized and placed in containers; N_2 is then introduced. W&Co

10 R 427
Seaweeds and their uses. [A book]
Chapman, V. J.
2nd edition xiii+304pp. (1970) [Numerous ref. En] London, UK: Methuen & Co.Ltd. £4 in UK only [Univ., Auckland, New Zealand]

This revised 2nd edition provides a description of the commercial uses of seaweeds under the following chapter headings: Occurrence and distribution of seaweeds (pp. 1-23); The early kelp industry and iodine production (pp. 24-47); The American Pacific coast potash industry, 1910-1930 (pp. 48-62); Seaweed as animal fodder and manure (pp. 63-85); Algae as food for man (pp. 86-118); Laver or 'nori' and carragheen or Irish Moss (pp. 119-150) Agar-agar (pp. 151-193); Algin and alginates (pp. 194-217); Minor uses of algae and their products (pp. 218-231); and Looking for seaweeds. The world's supples (pp. 232-261). A detailed selected bibliography, author and person index, plant index and subject index are provided. JN

10 U 752
Current food additives legislation - Netherlands.
Food & Agriculture Organization
Current Food Additives Legislation 1969 (130) 10 (1969) [En] [Rome, Italy]

Decree of 11 Dec., 1968 amends the Margarine decree, to bring 'halvarine' within its provisions. The definition of 'halvarine' is as for margarine, except that the fat content must be ⩾39 but ⩽41%. The additives permitted are as for margarine, except that only pectin, carageenan, guar gum, agar-agar, gum tragacanth, gelatin, methylcellulose, carboxymethylcellulose and its salts and alginates may be used as thickeners. Halvarine may contain ⩽1% thickener and/or emulsifier. VJG

11 G 415
[Interrelation of weights of pectin, acid, and sugar in jelly making.]
Tajiri, T.; Matsumoto, K.; Hanada, K.
Bulletin of the Research Institute for Food Science. Kinki University [Kinki Daigaku Shokuhin Kagaku Kenkyusho Hokoku] 5: 25-29 (1968, publ. 1969) [3 ref. Ja, en] [Res. Inst. of Food Sci., Kinki Univ., Higashiosaka, Japan]

The relationship between quantities of pectin, acid and sugar, and temp. and time of heating during jelly making, was investigated using citrus fruits, grapes and apples. Results showed that 1.5% pectin, 0.5% acid and 65% sugar were suitable for producing a jelly of good flavour and colour. Heating was at 90°C for 60-80 min on a water bath or 30-40 min by direct heating. SKa

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12 T 622
Manufacture of jams, sauces and pickles.
Molyneux, F.
Process Biochemistry 6 (5) 17-18 (1971) [3 ref. En] [Dept. of Chem. Eng., Swinburne Coll. of Tech., Victoria, Australia]

The role of sugar and pH in the formation of pectic gels is briefly described. The manufacture of jams, pickles and sauces and the treatment of effluent from such processes is discussed. AFe

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12 T 599
[Application of colloidal substances to foods.] [A review]
Yamazaki, S.
Food Industry [Shokuhin Kogyo] 11 (2) 74-77 (1969) [5 ref. Ja]

Colloidal substances are classified into polysaccharides (starch, pectin, and gums), proteins (gelatin, egg albumin, milk albumin, etc.), and synthetic gums (carboxymethylcellulose, methylcellulose, dextran, etc.). Examples of their application are given such as superwhip gelatin for cakes, waxy starch for pie filling, carrageenan for dessert foods, utilization of alginic acid for artificial cherries, and guar gum in low calorie food. SKa

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12 M 1349
[Unsalted bread with low protein content.]
Radoeva, A.
Khranitelna Promishlenost 19 (2) 39-41 (1970) [17 ref. Bg]

Basic raw-materials used were wheat starch, potato mash and white wheat flour. The protein content was 1.57%, protein being replaced by substances having a high swelling capacity: pectin, alginate, gelatin, agar, casein, gum arabic, yeast, egg white, sugar, fat. The bread was identical appearance to conventional bread. The porosity was uniform. A mixture of $CaCl_2$ and glutamic acid solutions was added to improve flavour. The caloritic value of the bread was 363.6 cal/100 g. STI

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12 L 1085
Hydrocolloids as icing stabilizers.
Svolos, T.
Bakers' Digest 45 (3) 57-61 (1971) [4 ref. En] [Basic Foods Inc., Englewood, New Jersey, USA]

Hydrocolloids are grouped into gums derived from tree exudates, seaweed colloids, seed extracts, water-dispersible cellulose derivatives and gelatin. The mechanism of gel formation is explained. Brief description of the most commonly used edible hydrocolloids; alginates, tragacanth, gum arabic, carrageenans, locust bean gum, guar gum, agar, cellulose gums, pectin substances, and gelatin are given. Hydrocolloids function by stabilizing the size of the sugar crystals, imparting body to the mass, aiding in the uniform aeration of the system, and by controlling the drying rate of the icing. Dextrose, corn syrups, invert syrups, lactose and fondants are also used in icings. Stabilizers are available in plastic or powder forms and are either of the boiling or non-boiling type. PEG

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11 U 832
Specification for agar, food grade.
India, Standards Institution
Indian Standard IS:5707-1970 7pp. (1970) [En] Price Rs 2.50. [Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 1, India]

This standard prescribes requirements and methods of test for food grade agar, i.e. the dried hydrophilic colloidal polygalactoside extracted from red algae (class Rhodophyceae), such as Gelidiella and Gracilaria spp. Agar must be commercially available in bundles consisting of thin, membranous strips or in cut, flaked, granulated or powdered forms; white or pale yellow in colour; odourless or have slight odour and mucilaginous taste; and insoluble in cold water but soluble in boiling water. Compositional requirements are: moisture (% by wt. on drying at 105°C for 5 h), 20; total ash (max. % by wt.), 6.5; acid-insoluble ash (max. % by wt.), 1.0; insoluble matter (max. % by wt.), 1; As (max. mg/kg), 3; Pb (max. mg/kg), 10. Agar must pass test for water absorption, gelatin and starch and dextrins. Packaging and marking, and sampling are also considered. Methods for determining water absorbed, total ash, acid-insoluble ash, gelatin, insoluble matter and starch and dextrins are appended. VJG

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11 R 479
[Method and apparatus for applying a seasoning paste to deep-frozen fish portions.] Verfahren und Vorrichtung zum Aufbringen einer Gewürzpaste auf tiefgefrorene Fischportionen.
Janssen, W. (Nordsee Deutsche Hochseefischerei GmbH)
West German Patent Application 1 949 710 (1971) [De]

Seasoning paste comprising thickening agents, fat, vegetable etc. is applied to rectangular, frozen fish portions by deposition of a quantity of the paste, which has a temp. of 10-18°C, onto the portion, and flattening it to a uniform layer using 1 or more rollers. The roller(s) may be profiled so that the layer surface is patterned to give an appetizing appearance. W&Co

11 M 1263
[Process for producing ready-to-eat fruit flans having good shelf-life.] Verfahren zur Herstellung gebrauchsfertiger und lagerfähiger Obsttorten.
Firma J. Heinrich Weseloh oHG
West German Patent Application 1 951 094 (1971)
[De]

Fruit is placed in the base of a sheet metal container having walls diverging upwards. A gel substance, comprising a starch or agar-agar base, is deposited on top, followed by a non-hygroscopic layer of flour or a protein compound; an inverted flan case is then superimposed. The container is closed, and the whole inverted so that the flan is detached from the container. W&Co

11 H 1679
[Change in apple pectins during juice production using enzyme preparations.]
Mikeladze, G. G.; Chogovadze, E. V.
Trudy, Gruzinskii Nauchno-Issledovatel'skii Institut Pishchevoi Promyshlennosti 4: 227-237 (1971) [12 ref. Ru] [Gruzinskii Nauchno-issled. Inst. Pishchevoi Promyshlennosti, USSR]

Proportions of flesh + skin, fruit stem and core, and detailed chemical composition, including pectin fraction content, are tabulated for 4 varieties of eating apples and for wild crab apples from 3 Georgian SSR localities. Protopectin predominated over soluble pectin in 1 of the 4 eating apple varieties and in all crab apples. Various pectolytic enzyme preparations with different pectin esterase and polygalacturonase activities were added to apple pulp before processing and values for yield and characteristics of juice obtained with and without enzyme treatment are tabulated and discussed. The main conclusions are that juice yield and clarification depend on content and kind of apple pectin; that pectin kind differs widely between apple types and varieties; that viscosity of juice increases with degree of pectin esterification and methoxylation; and that enzyme treatment lowers juice viscosity and increases yield. SKK

Vol 4

1 G 20
[Encapsulated liquid foods.]
Meiji Seika Kaisha Ltd.
Japanese Patent 17 941/71 (1971) [Ja]

Liquid foods are thickened by addition of carrageenan and an acid, after which the resultant gelatinized food is coated with a solution of water-soluble alginate and brought into contact with an aqueous solution of Ca salt. The resulting granules may be pasteurized in boiling water. IFT

1 G 52
Agar agar in confectionery jellies. Preparation and uses.
Ingleton, J. F.
Confectionery Production 37 (9) 544&546 (1971)
[En]

The production of agar and its properties are described, and a recipe is given for the preparation of fruit jellies using agar. BFMIRA

1 G 53
[Process for producing a bakeable gel for use as fruit flan glaze, and for fruit- and gel-filled bakery products]. Verfahren zur Herstellung eines backfähigen Gelees als Guss für Obstkuchen und -torten, für obst- und geleegefüllte Back- und Dauerbackwaren.
Pietschmann, B.
West German Patent Application 1 642 561 (1971)
[De]

A fruit flan is produced by spreading the dough in a baking tin, covering the surface with an edible wafer, and adding fruit, e.g. strawberries or cherries, which are then covered with a gel consisting of a cold-setting starch or an alginate mixed with fruit juice and sugar. The gel also contains a thickening agent which thickens at a higher temp. than the cold-setting starch, thus preventing the gel from liquefying during baking. The fruit flan is then baked, baking time and temp. being determined solely by the dough. During baking, the fruit and gel are sterilized. For fruit- and gel-filled products, the fruit and gel are mixed together and enveloped in dough. W&Co

1 L 60
[Cold-gelling edible starch thickener.]
Grzeskowiak, M.; Piechanowski, J.
Przemysl Spozywczy 25 (7) 265-266 (1971) [3 ref. Pl, ru, en, fr, de]

Potato starch is suspended in an aqueous solution of a mixture of mono- and disodium phosphates, the suspension is filtered in a vacuum installation dried at 55°C to 2% moisture content, heated to 150°C for 4 h, and excess of phosphates is removed by washing with aqueous ethanol. In a 2nd stage of manufacture, the product is acidified with citric acid, brought to glue-like consistency by addition of water, roller dried and comminuted to the desired grain size. This 2-stage process is said to use 5 × less phosphates than the unspecified American procedures and to yield an instant cold-gelling thickener that can be used for a variety of culinary purposes. The thickener was found equal in this respect to Project-97 starch manufactured in the Netherlands. SKK

1 M 41
Instant wheat farina.
Hyldon, R. G. (Quaker Oats Co.)
Canadian Patent 874 926 (1971) [En]

Process is described in which denatured wheat farina is combined with critical amounts of a thickening agent and water, put on a drum drier and comminuted. IFT

1 M 91

[Canned fruit flan with almost unlimited shelf life.] Obstkuchen in der Dose mit nahezu unbegrenzter Haltbarkeit.

Goldhofer, R.

West German Patent Application 1 953 179 (1971) [De]

Fruit is placed in a can and a starch or agar-agar gel is deposited on top. When the gel has set, a thin egg white coating is applied, onto which a wafer is placed. A ready-baked sponge or short-crust pastry flan base, covered with jam on one face for adhesion to the wafer, is inserted into the can which is then closed. The product is sterilized at 90-95°C for ~25-45 min. The hardened egg white and the thin wafer prevent moisture from leaking through to the flan base. W&Co

1 P 90

[Hard-frozen ice cream portions.] Portioniertes, hartgefrorenes Speiseeis.

Rau, W.

West German Patent Application 1 692 383 (1971) [De]

Ice cream is encapsulated in flavoured gelatin, agar-agar or starch, and the product is frozen. The ice cream may contain fresh fruit, e.g. strawberries soaked in syrup. The outer casing reduces the sensation of coldness in the mouth. W&Co

1 Q 5

Frozen confection.

Unilever Ltd.

British Patent 1 233 258 (1971) [En]

Frozen confection having an ice cream texture comprises a stable, coagulated foam matrix containing 12-40% of heat-coagulable protein such as egg white, 10-15% sucrose, and a minor amount of guar gum or carrageenan as thickening agent. IFT

1 T 15

Stabilizing relish liquors.

Anon.

Canner/Packer 140 (5) 11 (1971) [En]

It has been found that liquor separation from sauces and relishes can be prevented by adding a water soluble hydrophilic colloid to stabilize, suspend and thicken the liquid. The colloid is soluble in hot or cold water and does not require cooking. Immediate thickening takes place, filling operations and fill wt. or vol. are more readily controlled. RPC

2 H 332

[Making powder for producing cold cloudy fruit drinks.]

Cristofaro, E.; Wuhrmann, J.-J. (Societe des Produit Nestle SA)

Swiss Patent 507 666 (1971) [Fr]

The cloudy appearance of the original fruit juice is reproduced by the use of a mixture of gum arabic, water and hydrogenated edible fat, emulsified and homogenized. In an example, 28.5 parts of gum arabic are heated in 45 parts of water to 50°C and stirred for 5 min, and 25 parts of hydrogenated peanut butter are added. The mixture is emulsified at high speed for 300 sec, then homogenized in 2 passes at 200 kg/cm^2. 90.75 parts of sucrose, 7.26 of citric acid, 0.69 of pectin, 0.47 of ascorbic acid, 0.39 of tricalcium phosphate, 0.39 of sodium carragheenate, 0.04 of yellow colorant, and 0.01 of orange colorant, are dry mixed together and ground to a particle size of 0.15-0.20 mm. The mixture is agglomerated with the emulsion, and the granules are dried in a fluidized bed. Aromatic concentrate of orange is then added. W&Co

2 J 215

[Sweet bean jelly.]

Mitsumori, K.

Japanese Patent 28 140/71 (1971) [Ja]

Mixtures of raw bean jam, sugar, agar-agar and water are heated and combined with grape wine to yield a sweet bean jelly product. IFT

2 J 241

Method and preparations for treating fruit for preserving.

Winterberg, A.

Israeli Patent 26 787 (1971) [En]

The possible period of storage of fruit is prolonged by treating the complete outer surface with an aqueous mixture of a gel-forming edible substance, e.g. pectic substances, agar-agar, gum arabic, gum tragacanth, cherry gum, carob-pip extract or plant mucilages, and drying the coating. Preferably, a mixture of a pectic substance, water and sugar is heated to 98-100°C, then cooled to 90°C and an edible acid is added. This mixture is applied at room temp. W&Co

2 L 133

[Process and apparatus for the continuous crystallization of sugar solutions.] Verfahren und Vorrichtung zum kontinuierlichen Kristallisieren von Zuckerlösungen.

Thiele, H. (Pfeifer & Langen)

West German Patent Application 1 958 050 (1971) [De]

A sugar solution is thickened, inoculated with a seeding suspension, and crystallized in stages by heating under vacuum, with controlled addition of syrup and condensate. Massecuite having a predetermined solids content is then extracted. The stages are controlled by measuring the viscosity, which is maintained constant in each stage, but increases in progressive stages. Preferably, the syrup flows at 50 m/min during thickening, the velocity being reduced during crystallization. The process is carried out in a vacuum crystallization vessel which has vertical partitions defining chambers, these being interconnected by an overflow. Flow of massecuite is induced by a thermo-siphon effect. W&Co

2 L 154
Marshmallow: technology and methods of manufacture
Minifie, B. W.
Manufacturing Confectioner 51 (4) 31-37 (1971) [14 ref. En] [Div. of Knetchel Res. Sci., Inc., Saltford, Bristol, UK]

Manufacture of various types of marshmallow is described, with reference to recipes, types of mixing and beating equipment, and properties of ingredients (corn syrups, dextrose, invert sugar, egg albumen, agar, gum arabic, gelatin, and modified milk and soy proteins). Factors reducing shelf-life are discussed; these include deterioration due to high moisture content, poor drying conditions, microbial degradation of whipping agents, oxidation of ingredients, crystallization of sugar, loss of aeration, and the anti-foam action of fats, oils and essential oils. Recommendations include efficient plant hygiene, sterilization of equipment and pasteurization of ingredients susceptible to microbial contamination. ATDW

2 P 176
[Process for producing an alcohol-free cream-like drink.] Verfahren zur Herstellung eine alkoholfreien Cremegetränkes.
Schütz, H. J.
West German Patent Application 1 951 842 (1971) [De]

A sugar-starch mixture is prepared, to which a pectic substance is added as emulsifier while the mixture is continuously agitated. After a flavouring has been admixed, the pH is adjusted to 4 and sorbic acid is introduced as preservative. The mixture is then heated to $\sim$50°C, and a vitamin solution containing vitamin A, E, thiamine, riboflavin, B_6 and ascorbic acid is admixed. The product is further heated to 60°C, held at this temp. for $\sim$1 h, and cooled gradually to 25°C with agitation. Suitable flavouring substances are cocoa powder, an emulsion of condensed milk and water, or fruit and condensed milk treated in a colloid mill. For diabetics, a mixture of sodium cyclamates and saccharin sodium is used. The beverage is suitable for children, old people and athletes. W&Co

2 P 203
[Process and equipment for producing cultured milk beverages.] Verfahren und Vorrichtung zur Herstellung von Sauermilchgetränken.
Exler, H. (Münsterländische Margarinewerke J. Lülf)
West German Patent Application 1 792 084 (1971) [De]

To milk cultured with Streptococcus cremoris and Str. lactis to a pH of $\sim$4.5 is added $\sim$30 g of an aqueous fruit juice solution with an acid number of 91-98 and containing $\geqslant$3 g citric acid/l. Then a mixture of sugar and a highly esterified, easy-gelling pectin obtained from citrus fruit is admixed, 3.5-8 g pectin/l. being used. The whole is homogenized in a 1st stage at 12-16°C and a pressure of 150-160 atm. and in a 2nd stage at 53°C at 350-380 atm. The product is then pasteurized for 20-30 min at 60-65°C. Shelf life is claimed to be several weeks. W&Co

2 P 250
[Food product based on milk protein and vegetable fat, and process for its production.]
Nahrungsmittel auf der Basis von Milchprotein und Pflanzenfett und Verfahren zu seiner Herstellung.
Albrecht, F.
West German Patent Application 1 692 584 (1971) [De]

Milk is slowly heated while adding to it 0.2-2.0% carob kernel flour and 0.2-2.0% carob bean gum (part or all of which may be substituted by an equal amount of agar), 0-2% gelatin, 0.01-0.30% of $\geqslant$1 edible organic acids, 0.01-1.00% mono- and/or diglycerides, 0.5-10.0% spray-dried skim-milk, 0.05-3.00% lecithin and 1-50% vegetable fat or oil. The mix is then heated for 5-15 min to 85-100°C. After cooling to 65°C, the product is homogenized and then inoculated with 0.1-10.0% of a yoghurt or other lactic acid culture, and/or 0.01-0.50% edible organic acids are added. The product may then be incubated for 1-20 h, and, after cooling, vegetables, spices, fruit, flavouring etc. may be admixed. The final product has a creamy to gel-like consistency. W&Co

2 T 110
[Seasonings.]
Ogawa, H.
Japanese Patent 25 692/71 (1971) [Ja]

Powdered seasonings for use in the preparation of soy sauce, mayonnaise and other foods are prepared by combination of glacial acetic acid and phosphates with spices, sweetenings, thickeners and the like. IFT

2 T 113
[Process for decolouring pectin extract or concentrates.] Verfahren zur Entfärbung von Pektinextrakten bzw. Pektinkonzentraten.
Bock, W.; Dongowski, G. (Germany, E. Deutsche Akademie der Wissenschaften zu Berlin)
West German Patent Application 1 692 609 (1971) [De]

Pectin solution with a DM content of 1-10% is percolated through a column of a decolorizing resin based on aromatic amines, or other highly porous resins with a high positive charge density and a coarse internal structure. Percolation is at 40-60°C and at a rate of 3-5 $cm^3/h/m^3$ resin. The resulting, purified pectin solution is for use as gelling or thickening agent or as preservative in food products. W&Co

2 T 115
Soy sauce.
Hsu, E. J.
United States Patent 3 598 614 (1971) [En]

Thickened soy sauce is prepared by heating liquid soy sauce of pH 4.5-5 with mixed gelatin and agar or with mixed glutinous rice starch and tapioca starch. IFT

2 T 121

Control of viscosity and emulsion stability in foods using modified microcrystalline cellulose.

McCormick, R. D.

Food Product Development 4 (4) 19-20, 22 & 26 (1971) [En]

A new microcrystalline cellulose stabiliser for food emulsions (Avicel-RC) can be used to sterilize products containing a normally heat sensitive emulsion. Avicel-RC functions as an emulsion stabiliser and thickener at sterilization temperatures by forming a colloidal dispersion of solid particles when sheared in the presence of water. Major physical properties of Avicel are given, together with data on viscosity of Avicel-RC 581 and 501 preparations and of blends with carboxymethyl cellulose. By varying the concn. o Avicel it is possible to produce either colloidal sols or thixotropic gels. Dispersions of Avicel-RC are compatible with most non-ionic and ionic polymers. Avicel-RC resembles starch in its mouthfeel and has no slimy taste. The ingredients used in its manufacture comply with FDA regulations. It also provides excellent suspending properties when used alone or in combination with CMC or MC. Its purpose is to stabilize emulsions already formed with a primary emulsifier. Formulation of a sterilized chocolate drink is given. JEP

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3 A 137

Cellulose ethers in the food industry.

Hawley, A. H.; Reveley, A.

IFST Proceedings 4 (2) 71-76 (1971) [En] [British Celanese Ltd., PO Box 5, Spondon, Derby, UK]

Cellulose ethers are classified into non-ionic (methyl cellulose, methyl ethyl cellulose, hydroxypropyl methyl cellulose) and ionic (sodium carboxymethyl cellulose) groups, and are characterised by their solubility, degree of substitution and degree of polymerization. Effect of heat, pH, electrolytes, enzymes and hydroxylic compounds on cellulose ethers is briefly considered. High water retention and zero calorific value of cellulose ethers have been used to advantage in development of slimming aids. Cellulose ethers will thicken, bind, thermogel, suspend, form emulsions and stabilize foams, aerate, absorb and retain water, form films and stabilize freeze-thaw when added to food products. Its main applications in the food industry, their advantages, and type and viscosity grade required are tabulated. PG

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3 J 378

Apple-flavoured thickener from apple peel.

Bomben, J. L.; Guadagni, D. C.; Harris, J. G.

Food Technology 25 (11) 1108-1109, 1112 & 1117 (1971) [6 ref. En] [W. Regional Res. Lab., Agric. Res. Service, USDA, Berkeley, California 94710, USA]

Apple peels were ground and pressed, and the resulting press cake was dried and ground into a powder. Apple pies containing this peel powder as a thickener were highly acceptable and generally had more flavour than pies made with standard starch thickener. Use of peel powder in various apple products appears to be a promising means of converting an uneconomical by-product into a useful product. IFT

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3 P 318

Purification and characterization of milk protease.

Chen, J. H.-T.

Dissertation Abstracts International. Section B. The Sciences and Engineering 32 (4) 1934: Order no. 71-25153 (1971) [En] [Cornell Univ., Ithaca, New York, USA]

Milk protease, thought to be involved in the age thickening and storage gelation of UHT milks, was extracted by Zittle's method from individual and pooled Holstein-Friesian milk and purified to a 184-fold increase in activity by chromatography on DEAE-cellulose at pH 8.5 and CM-cellulose at pH 6.0. Max. proteolytic activity was observed at pH 8.0 and although relatively stable between pH 1.5 and 9.0, the protease was most stable between pH 6.0 and 8.0; the enzyme being completely inactivated by heating at 80°C for 10 min. The protease displayed some trypsin-like activities and hydrolysed β-casein at 3 × the rate of α_s-casein; κ-casein and β-lactoglobulin showing no signs of hydrolysis. $\sim$90% of the β-casein hydrolysates were precipitated with 2% TCA and migrated as 2 slow-moving zones in polyacrylamide gels at pH 9.1; these hydrolysates were aggregated and resistant to further break down by milk protease. SAC

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3 Q 30

A comparative study of sensory and cooking characteristics of frozen duck, goose, hen and turkey eggs.

Fletcher, D. A.; McCalla, C. A.; Petrasovits, A.

Canadian Institute of Food Technology Journal 4 (3) 116-119 (1971) [20 ref. En, fr] [Poultry Div., Production & Marketing Branch, Canada Agric., Ottawa, Ontario, Canada]

30 dozen each of duck (Pekin), goose (Pilgrim), hen (White Leghorn) and turkey (White Holland) eggs were processed into non-pasteurized frozen whole eggs, yolks and whites to compare them in terms of egg flavour intensity, cake tenderness, cake vol., thickening function, foam vol. and stability. The sensory characteristics were assessed by experienced judges using the method of paired comparisons. In terms of egg flavour intensity, frozen whole duck, goose and turkey eggs were as acceptable to the judges as frozen whole hen eggs. For cake tenderness, frozen whole turkey eggs were less acceptable than the other 3 types of eggs. There were no appreciable differences in cake vol. among the 4 types of eggs. The thickening function of frozen duck, goose and hen egg yolks was approx. the same; the frozen turkey egg yolks spread more than the frozen goose egg yolks. Frozen hen egg whites yielded greater foam vol. than those from duck and they were more stable than those from turkey. AS

4 L 361

[Pectin as gel forming agent in sweet centres.]

Jarczyk, A.; Herbst, A.; Wyczanski, S.

Przeglad Piekarski i Cukierniczy 19 (9) 209-211 (1971) [5 ref. Pl]

Tests showed that Danish pectin (Genupectin) may be used as a gel forming agent for sweet centres instead of common agar. Optimum dose of this particular pectin is 1.1%. Temp. of the filling must not fall below 77°C during forming; the forming itself must not proceed longer than 30 min, starting from the moment of mixing all the ingredients. It is recommended that slow-acting pectin be used. Using pectin instead of agar contributed to the lowering of production costs. STI

4 L 362

Fruit jellies.

New Time Foods Ltd.

British Patent 1 250 782 (1971) [En]

Mixtures of fruit juice, sucrose and glucose syrup are boiled until a solids content of ≥65% is achieved, after which the mixtures are cooled to form a clear jelly to which is added pre-formed pectin jelly shapes of a contrasting colour. IFT

4 T 212

[Determination of rheological properties of liquid foods. I. Thickening agents.]

Escardino, A.; Fito, P.; Molina, A.

Revista de Agroquimica y Tecnologia de Alimentos 11 (3) 418-426 (1971) [10 ref. Es, de, en, fr] [Dept. de Quimica Technologia, Fac. de Ciencia, Valencia, Spain]

A capillary viscosimeter was developed incorporating some improvements over models previously reported in the literature, and its efficiency shown by a series of tests with aqueous conc. sucrose solutions (~25-50%). Rheological properties of aqueous solutions of carboxymethyl cellulose (0.1-2.0% by wt.) and pectin (0.5-2.0%, in 8.36% aqueous sucrose) were determined at several concn. and at 20°C. The behaviour of both solutions was typically pseudoplastic, non-newtonian properties being more noticeable at higher concn. of CMC or pectin. Empierical equations were derived for the range of conditions considered, that relate rheological properties of K' and n' to CMC and pectin concn. AS

4 T 237

[Composition of commercial mayonnaises.]

Carballido, A.; Santamaria, M. J.; Menendez, M. A.

Anales de Bromatologia 23 (1) 75-98 (1971) [42 ref. Es, en] [Dept. de Investigaciones Bromatologicas (CSIC), Escuela de Bromatologia, Univ., Madrid, Spain]

Samples of 9 commercial mayonnaises of Spanish manufacture and 1 of foreign manufacture, all in hermetically sealed glass containers, were examined. Components listed on the labels are named and individual values for content of ether extract, moisture, N, protein, sugar, ash, salt, Ca, P, and acidity (as acetic acid), for fat characteristics and results of colour reactions for particular oils, are tabulated. All 10 mayonnaises were based on seed oils, 6 contained artificial colouring, and 3 contained stabilizers (agar + pectin or gun). SKK

5 G 223

[Enrichment of stewed fruit with dried milk.]

Betancourt, F.; Veliz, P.

Industria Alimenticia 2 (3) 23-36 (1971) [33 ref. Es, en, fr]

The addition of dried milk to 4 stewed tropical fruits, mango (Mangifera indica), pawpaw (Carica papaya), guava (Psidium guajava) and plantain (Musa paradisiaca var. Sapientum Kuntze), was studied first on a laboratory scale and then tested under pilot plant conditions with the aim of producing a more nutritious fruit product similar in appearance to commercial stewed fruits already available. To prevent the appearance of white casein precipitate, fruit pulp (50-70%), milk (7-14%) and sugar (1-13%) were mixed before the addition of ~0.3% agar-agar as stabilizer and homogenized, followed by the addition of citric acid to lower pH to <4.5, except for guava pulp. Optimum content of dried milk was found to be 5-7, according to the type of fruit used. The product, containing 2.65-4.5% protein and sterilized at 250°F for 20 min, had a satisfactory flavour. SAC

5 G 252

Utilization of pectin in food industry.

Riaz, R. A.

Science and Industry (Karachi) 8 (1) 11-16 (1971) [11 ref. En] [Mitchell's Fruit Farms Ltd., Renala Khurd, Distt. Sahiwal, Pakistan]

Pectins are made up of long chains of galacturonide units, and their uses are based mainly on their colloidal properties. Main uses of pectin described include: addition to preserves, jams, jellies and marmalades as an aid to setting; stabilization of the colloidal system in fruit juices, which is desirable in tomato and citrus juices, but is removed by pectinases from conc. and carbonated juices; as an emulsifying agent for castor oil, mineral oil, mayonnaise, spray ingredients and egg substitutes; in bakery products to enhance water holding capacity of cake or bread, and retard staling, as a filler, and in leavening powder in which it lengthens useful life of the mixture and controls release of CO_2 without leaving an undesirable mineral residue; in jelly-type confections; in dairy products as an "emulsion-breaker" causing coagulation; for influencing texture and firmness in frozen and dehydrated fruit and vegetables; and for softening fruit and vegetables during storage, pickling and cooking. PG

5 P 728
Preparing processed cheese.
Rohlfs, H. A.; Koch, W.; Scheurer, G. (Benckiser-Knapsack GmbH) (W. Germany)
United States Patent 3 615 586 (1971) [En]

It is claimed that processed cheese of superior texture, aroma and keeping quality is obtained by melting the cheese with a mixture of a suitable melting salt and a phosphate-modified starch as a thickening agent. The amount of phosphate-modified starch in the processed cheese should preferably be 1.0-2.5% and the total amount of phosphate-modified starch and melting salt 2.5-4.0%. EJM

5 S 640
[Chicken loaf.]
Chuo Shokuhin Co. Ltd.
Japanese Patent 41 571/71 (1971) [Ja]

Chicken meat is mixed with a seasoning composition containing a jellied soya seasoning incorporating 1 part of gelatin to 4 parts of agar, after which the composition is fed to a stuffer and boiled. IFT

5 T 291
Variegating sauce base.
Stewart, A. P., Jr.; Gregory, J. C.
United States Patent 3 615 594 (1971) [En]

Aqueous base compositions contain 1.5-3% pectin, 0.6-1.2% food acidulant, 8-21% sugar and 15-25% flavouring agents, and gel at ambient temp. upon mixing with a sugar syrup to provide a variegating sauce for food products with viscosity in the range 8×10^4 - 1×10^5 cP. IFT

5 U 237
[Process for the production of a stable dough-leavening emulsion.] Verfahren zur Herstellung einer stabilen Teigsäuerungsemulsion.
Augendopler, A.
West German Patent Application 2 118 637 (1971) [De]

A mixture of rye flour, water and sour dough is fermented until the max. degree of acidity is reached. Then edible acids, e.g. lactic or acetic acid, are added to reach the desired final acidity, followed by admixture of thickeners, e.g. soluble polysaccharides. The resultant stable emulsion is packaged in aroma-tight packages, ready for use in bread production. Alternatively, aromatic substances and acids are extracted from the emulsion and, after addition of water and colloidal gels, the extract is packaged aroma-tightly. W&Co

6 A 269
Some flow properties of foods in null gravity.
Rambaut, P. C.; Bourland, C. T.; Heidelbaugh, N. D.; Huber, C. S.; Smith, M. C., Jr.
Food Technology **26** (1) 58-63 (1972) [13 ref. En] [Preventive Med. Div., NASA/Manned Spacecraft Center, Houston, Texas 77058, USA]

By flying in Keplerian trajectory, jet aircraft can simulate space flight conditions, providing ~30 sec of conditions of weightlessness; 300 such trajectories have been flown to test various foods and food systems. The behaviour of selected foods was recorded by high-speed cine cameras and experienced observers. 36 foods tested so far include sandwich spreads, puddings, bite-size foods, beverages, entrees, condiments and canned fruit. The behaviour of milk under normal gravity and weightlessness conditions is described and illustrated with photographs. Under conditions of weightlessness, a milk stream does not splatter upon impact with a surface but forms, and rebounds as, a globule; similarly, there is no splashing when a spoon is struck on the surface of a dish of milk as the spoon merely penetrates the surface cleanly and enters the milk. The addition of thickening agents such as soluble starches is the most common formula change found necessary to make foods easier to eat under conditions of weightlessness experienced on space flights. SAC

6 G 296
Dry soup mixes.
Spice & Flavour Services Ltd.
British Patent 1 254 562 (1971) [En]

Dry instant soup mixes, suitable for use in automatic vending machines, contain a thickening agent such as potato starch which with other ingredients is coated with a fat containing an emulsifying agent. IFT

6 G 321
Instant soup, sauce and gravy mixes.
Riddolls, D. H. (Canada Vinegars Ltd.)
Canadian Patent 891 975 (1972) [En]

A ready-to-use instant soup, sauce or gravy mixture in dry granular form consists of a pregelatinizing thickening agent coated with a mixture of edible fats and flavourings. IFT

6 T 331
Utilization of stabilizers and thickeners as additives in food industry.
Riaz, R. A.; Rasulpuri, M. L.
Science and Industry (Karachi) **8** (1) 17-21 (1971) [11 ref. En] [Agric. Univ., Lyallpur, Pakistan]

The topic is considered under the headings: source (natural and synthetic or semi synthetic); functional classification (emulsion, frozen desserts, process cheese, suspension, jellies and foams); main applications (dairy products, beverages, bakery

products, confectionery products, dressing and sauces, dietetic foods, meat and fish products).
VJG

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6 T 335
Symposium: phosphates in food processing. [A book]
deMan, J. M.; Melnychyn, P. (Editors)
ix+242pp. ISBN 0 87055 105 1 (1971) [Numerous ref. En] Westport, Connecticut, USA: AVI Publishing Co. Inc. Price $20.00 (US), $21.00 (Foreign) [Dept. of Food Sci., Ontario Agric. Coll., Univ. of Guelph, Canada]

Papers given in this book were presented at a symposium on phosphates in food processing held at Guelph Univ., Ontario, Canada in 1970. The symposium was divided into 4 sections: Chemistry, nomenclature, manufacutre, and analysis of phosphates (pp. 1-48); Interactions between phosphates and individual food components (pp. 49-102); The use of phosphates in food products (pp. 103-212); and Public health consideration of the use of phosphates in food processing (pp. 213-234). Individual papers were: Chemistry of the phosphates and condensed phosphates, by J. R. van Wazer (pp. 1-23, 39 ref.); The nomenclature and manufacture of phosphates, by R. N. Bell (pp. 24-37, 17 ref.); Analysis of phosphates in foods, by J. M. deMan (pp. 38-48, 24 ref.); Interaction of milk proteins with phosphates, by P. Melnychyn & J. M. Wolcott (pp. 49-64, 45 ref.); Interactions between phosphates and meat proteins, by R. Hamm (pp. 65-82, 49 ref.); Interactions between phosphates and plant proteins, by M. M. Hamdy (pp. 83-90, 28 ref.); Interactions between phosphates and gelling and thickening agents, by R. E. Sand & C. S. Sodano (pp. 91-102, 20 ref.); Starch phosphates, by F. E. Kite (pp. 103-119, 41 ref.); The use of phosphates in cheese processing, by L. G. Scharpf, Jr. (pp. 120-157, numerous ref.); General concepts applicable to the use of polyphosphates in red meat, poultry and seafood processing, by J. H. Mahon, K. Schlamb & E. Brotsky (pp. 158-181, 45 ref.); [Continued in following abstr.] JA

7 A 330
[The penetrometer as an instrument for rheological analysis of gelled systems.] Das Penetrometer als Instrument für die rheologische Analyse gelierter Systeme.
Wozniak, J.; Beltman, H.; Pilnik, W.
Lebensmittel-Wissenschaft und Technologie **5** (1) 17-20 (1972) [5 ref. De, en] [Inst. für Biopharmazie, Med. Akad., Warsaw, Poland]

Measurement of deformation of gels under constant load was compared using a coaxial cylinder instrument (FRA Jelly Tester) and a cone type penetrometer; various gels to represent elastic, visco-elastic and viscous systems were prepared from: gelatin, pectin, carrageen, carob and carboxymethyl cellulose; and polyvinyl alcohol-borax. Results agreed well and by plotting penetration of a cone against logarithm of time, curves were obtained from which the elastic, retarded elastic and viscous components of the total deformation could be derived. Advantages of the penetrometer are speed of use and its low price.
ELC

7 G 339
Formulating low calorie foods with carbohydrate gums.
Finberg, A. J.
Food Technology **26** (3) 28-30 (1972) [En] [19A Garden Place, Brooklyn, New York 11201, USA]

Gums are used in low calorie foods to: thicken or improve body; cover flavours; smooth flavours; provide bulk; aid in carbonation retention; and control ice crystal formation. Carbohydrate gums, which include modified gums as well as natural gums, can be grouped into 5 categories: seaweed extracts, e.g. agar, algins, carrageenans; plant seed gums, e.g. locust bean gum, guar gum; polysaccharide gums, e.g. xanthan gum; plant exudates, e.g. gum arabic, gum tragacanth, gum karaya; and synthetics, e.g. sodium carboxymethyl cellulose, hydroxypropyl methylcellulose, methylcellulose, microcrystalline cellulose. The selection of the appropriate gum for a specific application is discussed with reference to: imitation syrups; jellies and jams; carbonated beverages; 900-calorie food preparations; canned fruit and fruit drinks; bakery products; and milk puddings and dessert gels. The production of pourable and spoonable dressings and the preparation of stable emulsions are briefly discussed. AB

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7 G 375
[Technological possibilities of manufacturing calorie reduced foods.] Technologische Möglichkeiten der Herstellung kalorienverminderter Lebensmittel.
Drews, H.
Ernährungs-Umschau **19** (2) 38-39 (1972) [10 ref. De] [53 Bonn-Bad Godesberg, Tulpenbaumweg 17, German Federal Republic]

The technological methods currently in use for the production of foods with a reduced calorie content are: substitution of fat by water and, optionally, indigestible fillers and thickeners, by protein or by carbohydrate; substitution of carbohydrates by water of by indigestible fillers; substitution of sugar by sweetening agents; and removal of alcohol. The use of these methods is reviewed. HBr

7 H 991
[Relationship between viscosity of fruit and berry juices and degree of pectin methoxylation.]
Mikeladze, G. G.; Chogovadze, E. V.
Trudy, Gruzinskii Nauchno-Issledovatel'skii Institut

Pishchevoi Promyshlennosti 5: 121-126 (1971) [8 ref. Ru] [Gruzinskii Nauchno-issled. Inst. Pishchevoi Promyshlennosti, USSR]

Solutions of (i) apple, (ii) lemon, (iii) rose-hip and (iv) damson pectin preparations were found to differ markedly at corresponding concn. in relative viscosity, despite qualitative similarity in composition. Similar results were obtained with solutions of rose-hip pectin preparation submitted to heat treatment (45°C) in the presence of added water and/or sugar and malic acid. 1% solutions of (i)-(iv) preparations were incubated for 4 h at 45°C with Avamorin PPK, Nigrin OP and Rapidase pectolytic enzyme preparations (see following abstr.) and changes in relative viscosity were measured at intervals. Decrease in viscosity was much more marked in (i) and (ii) than in (iii) and (iv) which is attributed to higher content of methoxyl groups in (i) and (ii) favouring pectin hydrolysis. Nigrin was found most, and Rapidase least, active in this respect. SKK

7 H 1053
Debittered orange juice.
Swisher, H. E. (Sunkist Growers Inc.)
United States Patent 3 647 476 (1972) [En]

Process is described for removing limonin from navel orange juice and the use of such juice along with a high-ester level pectin in the formulation of a cows' milk beverage incorporating the juice. IFT

7 L 490
Beet-sugar technology. [A book]
McGinnis, R. A. (Editor)
2nd edition xxx+835pp. (1971) [Numerous ref. En] Fort Collins, Colorado, USA: Beet Sugar Development Foundation Price $20.00

This book for sugar beet factory technicians, growers, and professional scientists, consists of over 50 articles on all aspects of beet-sugar manufacture. In addition to a 14pp. glossary of technical terms, a list of ~50 books on beet sugar, and a 10pp. summary of factory equipment and process constants and practices, the following chapters are included: Agriculture, by P. B. Smith (pp. 1-24, 29 ref.); The sugar beet and sucrose formation, by R. Wyse (pp. 25-33, 35 ref.); Chemistry of the beet and processing materials, by R. A. McGinnis (pp. 33-74, 98 ref.); Payment for beets, by R. E. Hallbeck (pp. 75-77); Analysis of sugar content, by R. A. McGinnis (pp. 77-84); Amalgamated automated tare laboratory, by J. R. Johnson & C. H. Brevick (pp. 87-90, 12 ref.); Beet storage, by R. A. McGinnis, D. L. Sunderland, R. H. Cotton & L. P. Orleans (pp. 91-106, 44 ref.); Preliminaries to processing, by A. G. Frost (pp. 107-120); Fundamentals of the process, by R. A. McGinnis (pp. 120-124); Diffusion, by H. O. Ebell & M. Storz (pp. 125-160, 68 ref.); History [of juice purification], by R. A. McGinnis (pp. 161-164); Chemical fundamentals [of juice purification], by Mr. & Mrs. J. Dedek (pp. 165-190, 135 ref.); Technology of juice purification, by R. A. McGinnis (pp. 191-236, 135 ref.); Thickening equipment, by R. H. van Note (pp. 236-248); Water-soluble polymers as settling aids: chemical development, by R. M. Sequiera (pp. 248-252). JN

7 L 569
Advances in icing technology.
Lipman, H. J.
Bakers' Digest 46 (1) 47-50 & 54 (1972) [16 ref. En] [Mallet & Co. Inc., Carnegie, Pennsylvania, USA]

Icings have been defined as coatings or glazes of sugar and water with other ingredients such as fat, milk solids, egg whites, chocolate and other flavours, salt and colouring substances present. Commercial icings are classified as sweet roll icings, cup cake icings and cake or cream icings which include creme fillings and whipped toppings. Icing instability can be prevented by using powdered icing bases that contain plant gums such as algin, gum arabic and pectin with pronounced gelling, suspending, emulsifying, stabilizing, film-forming and water-holding properties. Type of packaging material to be used is of major significance in establishing the degree of stabilization required by the icing. Shortenings used in icings now contain selected mono- and diglycerides with sorbitan monostearate either alone or with polysorbate 60. Practical guidelines for icing preparation are outlined. Glazes can now be successfully applied to doughnuts and fried pies. Enrobing of snack cakes with cocoa butter coating, a hard vegetable butter chocolate type coating or a pastel type coating is discussed. Types and operation of icing depositors are described. PG

7 P 1072
Preparation of sour milk drinks.
Exler, H.
United States Patent 3 643 586 (1972) [En]

The process involves the steps of acidifying fresh skim-milk by adding an aqueous solution of citric acid, adding a concentrated flavouring compound, followed by a pectin-sugar mixture and homogenizing the product at a temp. of 12-16°C and a pressure of 150-160 atm. The temp. is then raised to 51-54.5°C and the mixture is homogenized a 2nd time at 350-380 atm. Finally, the product is bottled and pasteurized for 20-30 min at 70-80°C. Examples for preparing raspberry, strawberry, orange, pineapple and cola drinks are given. EJM

7 U 435
Food additives. Components of paper and paperboard in contact with aqueous and fatty foods.
United States of America, Food and Drug Administration

Federal Register 37 (62, Mar. 30) 6470-6471 (1972) [En]

Sodium polyacrylate may be used under the Federal Food, Drug and Cosmetic Act as a component of paper and paperboard intended for use in contact with food as a thickening agent for natural rubber latex coating (max. 2% of coating solids) and as a pigment dispersant (max. 0.125% of pigment). CAS

7 U 524
[Starch products: test methods for dextrins.]
Poland, Polski Komitet Normalizacyjny
Polish Standard PN-71/A-74700 8pp. (1971) [Pl]

This standard replaces PN-63/A-74700 and covers determination in white (W) and yellow (Y) dextrins obtained by acid hydrolysis of odour (organoleptic); colour ('Spekol' photocolorimeter for W, Lovibond tintometer for Y); foreign matter (sifting); macroscopic impurities (visual counting); moisture (gravimetry); acidity (titration, potentiometric titration for Y); pH; ash (heat ashing, gravimetry); solubility (refractometry for W, centrifugation or gravimetry for Y); reducing substances (W only, iodometry); viscosity (Y only, Höppler viscometer); index of thickening (Höppler viscometer); and stretch resistance when dry of mixtures including dextrins and intended for casting. SKK

7 U 558
[The Danish food laws.] [A lecture]
Jorgensen, H. J.
Maelkeritidende 85 (16) 409-421 (1972) [Da]

A general outline is given of the current position in Denmark with regard to food legislation. Aspects discussed include antibiotics, antibiotic-destroying substances and hormones; antioxidants; emulsifiers; enzymes; dyestuffs; changes in redox potential in foods; preservatives; pH; odour and flavour compounds; stabilizers (binders) and thickeners (gelling agents); synthetic sweeteners; vitamins; pesticides; labelling of foods; food hygiene; and mental hygiene. HBr

8 G 392
[Effect of wheat flours and various kinds of prepared solution on amylograph viscosity (in the preparation of custard cream).]
Takebayashi, Y.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 18 (4) 178-182 (1971) [3 ref. Ja, en] [Tachikawa Coll. of Tokyo, Akishima, Japan]

36 g wheat flour (8.1 or 14.9% protein) or corn starch was mixed with 36 ml liquid (water, cows' milk, reconstituted dried skim-milk (1:9), either alone or mixtures of these) in 27 different combinations for viscosity measurements using an amylograph. Corn starch showed higher max. viscosity, greater rates of thickening during heating and cooling and higher final viscosity than wheat flour. Reconstituted dried skim-milk showed slightly higher max. viscosity and lower rate of thickening during heating than milk. Thus in preparing custards, the use of wheat flour and water can produce a satisfactory product from the viewpoint of physical properties, and a smaller amount of corn starch can replace wheat flour. SKa

8 P 1136
[Ice cream products.]
Unilever NV
Netherlands Patent Application 6 916 493 (1970) [Nl]

A hot mixture containing fruit puree jelly, which is soft at -20 to 0°C, preferably 0.5-2.0% gelling agent, e.g. agar mixed with carob bean flour, and 10-40% sugar is set in pipes and extruded from them in rods. These may be chopped into an ice-cream mix by rotary cutters or cut by pumps which discharge the portions into the ice cream. W&Co

8 T 459
Scales of subjective viscosity and fluidity of gum solutions.
Moskowitz, H. R.
Journal of Texture Studies 3 (1) 89-100 (1972) [12 ref. En] [Pioneering Res. Lab., US Army Natick Lab., Massachusetts 01760, USA]

Subjective viscosity and fluidity of water soluble gums (including alginates, gum arabic, carrageenan, ghatti gum, guar gum, karaya gum, locust bean gum, pectin, cellulose gum, tragacanth gum and xanthan gum) were investigated as a function of apparent physical viscosity (in poises), and as a function of the method of presentation. Subjective magnitude (S) appeared to grow as a power function of viscosity (P) with $S = kP^n$, and the exponent n averaging about +0.4 for subjective viscosity, and -0.4 for subjective fluidity. Stimuli appeared more viscous (and less fluid) when presented in narrow-mouthed test tubes than in wide-mouthed bottles. The growth rate of subjective magnitude, indexed by n, did not change, however, suggesting that the dynamics of subjective magnitude viscosity and fluidity are independent of magnitude for viscosity and fluidity are independent of the presentation procedure. AS

9 G 446
Amylose-thickened food products.
Muynck, E. P. L. de; Branteghem, A. E. van (Corn Products Co.)
Canadian Patent 900 262 (1972) [En]

Food compositions, such as puddings, are thickened with amylose, and contain a water-insoluble alginate gel formed in situ for inhibiting retrogradation of the amylose. IFT

9 G 463

Hydrocolloids in fabricated foods.

Hood, L. F.

New York's Food and Life Sciences 5 (1) 17-18 (1972) [2 ref. En] [Dept. of Food Sci., Agric. Expt. Sta., Ithaca, New York, USA]

Hydrocolloids, which can be dissolved or dispersed in water to give viscous solutions or dispersions, are mostly derived from plant sources (except for gelatin) and are classified as natural (tree exudates, seaweed, cereal starches), modified (pregelatinized and modified starches, cellulose derivatives) and synthetic (vinyl and ethylene oxide polymers). The principal functions of gums in foods are as gelling and thickening agents e.g. in gelatin desserts, starch-based milk puddings and custards, pectin-based jellies and prepared pie fillings. Carrageenan, derived from red marine algae, is used extensively in dairy foods, beverages, bakery products, sauces and dressings. 2 major fractions, kappa (forms firm gels) and lambda (nongelling) can be separated. The particular reaction of carrageenan with milk protein seems to depend on the number and position of sulphite groups attached to the polysaccharide. PG

9 N 464

[Method for obtaining food emulsions.]

Tolstoguzov, V. B.; Braudo, E. E.; Mikheeva, N. V.

(**Union of Soviet Socialist Republics**, Institut Elementoorganicheskikh Soedinenii AN SSSR)

USSR Patent 303 819 (1971) [Ru]

To obtain emulsions, e.g. for mayonnaise production, by emulsification of animal and/or vegetable fats in aqueous solution of proteins, amino acids or carbohydrates, or their mixtures, ≥1 salt of polyvalent metals are added and dispersed in the fat. Before emulsification, edible surface-active polyelectrolytes, e.g. polysaccharides, are added to the solution, to form insoluble, mechanically strong gel salts on the surface of the fat particles on reaction with polyvalent metal ions. The salt is preferably calcium acetate in 1-3% aqueous solution, or dry calcium gluconate, added at concn. of 0.004-0.010 g/100 g final product. The polyelectrolyte is preferably a 0.1-1.0% solution of slightly esterified pectin or sodium alginate, added at concn. of 0.01-0.10 g/100 g emulsion. The fat:solution ratio is preferably 1:1-4:1. W&Co

9 T 514

[Sodium-carboxymethyl cellulose and its use in food processing.] [A review]

Ishizuka, T.

Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 17 (5) 211-220 (1970) [130 ref. Ja] [Central Res. Lab., Daiichi Kogyo Seiyaku Co. Ltd., Shimogyo-ku, Kyoto, Japan]

Physicochemical properties of sodium carboxymethyl cellulose, its interaction with food components, and applications, are reviewed. Major topics considered are: viscosity, particularly its dependence in concentrated solution on the degree of polymerization; rheological characteristics; stability of 1 and 2% solutions as a function of temp. (0-80°C) and pH (3-13); effect of enzymes; and toxicity tests. Data is cited for interaction with: cations of varying charge, water-soluble gums, casein, soybean constituents, whey proteins, and sucrose. Numerous examples of its application are given: milk-based soft drinks; ice-cream mix; processed wheat flour products; as a preservative glaze for frozen fish; in the production of solid or powdered sauces, flavourings, and drinks; and as a thickener or thixotropic agent. KH

10 E 407

Method of preserving foodstuffs.

Muller, F. L.

South African Patent 71/4067 (1972) [En]

Self-sterilization of a raw or partly heat-treated food product is effected by admixing the unheated foodstuff with a thickening agent having negatively charged molecules, and then storing the food at a temp. at which any microorganisms present are destroyed through autolysis. The food product is treated on and/or after addition of the thickener, to reduce its fermentation potential and/or increase its fermentation inhibiting potential to a value above that effected by the thickener. The product is then stored at ≤25°C. W&Co

10 G 511

Reconstitutable jelly.

Patronato de Investigacion Cientifica & Tecnica 'Juan de la Cierva'

British Patent 1 270 973 (1972) [En]

Fruit dried by lyophilization is mixed with pectin, food acids and sugar in a dry atm. or under vacuum to yield a composition to which water is added to form the final reconstitutable jelly product. IFT

10 L 749

Cooked starch texture without cooking - cold-water swelling tapioca starch.

Anon.

Food Processing 33 (5) 34 (1972) [En]

Tapioca starch has been modified to ensure ease of dispersion and complete rapid hydration in cold water, and can be used as a thickener, suspension agent, stabilizer and whipping aid. The texture produced is that of cooked starches. The bland flavour is particularly suited for use in dairy or simulated dairy foods and light cream sauces. Other suggested applications are as a thickener in dry instant puddings, a suspension agent for flavoured powders, a whipping aid in marshmallows and meringues etc. Savings may be achieved as the starch is less costly than gums, requires no heating and cooling, requires a lower use level for a given viscosity than pre-gelatinized starches and requires no premixing with other ingredients to prevent lumping. PG

10 L 769
Starch thickeners.
Cerebos Foods Ltd.
British Patent 1 275 331 (1972) [En]

Starch-containing products readily dispersible in boiling water to give thickened gravies are prepared by spray-drying aqueous compositions containing a hydrophilic colloid and ungelatinized starch at temp. of <55°C to prevent gelatinization. IFT

10 M 1183
Jelly-filled pastry.
Imperial Chemical Industries Ltd.
British Patent 1 275 049 (1972) [En]

Baked pastry products containing jellied meat or fruit filling are gelled with agar and a cellulose ether or ester such as sodium carboxymethylcellulose. IFT

10 S 1349
[Effect of additives on technology and quality of meat products.] Hilfs- und Zusatzstoffe und ihr Einfluss auf Technologie und Qualität von Fleischwaren.
Wyler, O.
Fleischwirtschaft 52 (6) 727-731 (1972) [De] [CH 3028, Spiegel bei Bern, Erlenweg 8, Switzerland]

The effects and applications of the most important food additives are discussed, including: NaCl, NO_3^-, NO_2^-, SO_2, glucono-δ-lactone, starter cultures, spices and spice extracts, smoke aroma, glutamate, ribonucleotides, water and ice, blood plasma, condensed acid polyphosphates, skim-milk powder, antioxidants, thickening agents and environmental residues e.g. disinfectants, pesticides, antibiotics, hormones, heavy metals. The effect of 24 additives or residues are presented in tabular form. RM

10 T 559
[Gelling properties of agar manufactured in Nagano. I. Variation of gel strength and unit weight of bar-style agar.]
Matsuhashi, T.; Takahashi, B.; Kitazawa, T.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 18 (6) 284-287 (1971) [4 ref. Ja, en] [Nagano Prefecture Lab., Agar-agar Ind., Chino, Nagano-ken, Japan]

Commercial agar samples manufactured in Nagano during 1961-1968 were tested and the data collected were analysed. Number of samples tested and gel strength (range and average for each year) were respectively: bar-style agar, 7064, 110-670, 259-316; stringy agar, 5425, 100-720, 300-379; and powdered agar, 606, 100-1250. Those for unit wt. of bar-style agar were: 4.3-12.1 (7.0-7.8) g. SKa

10 T 560
[Gelling properties of agar manufactured in Nagano. II. Melting point variation and the relationship between melting point and gel strength.]
Matsuhashi, T.; Kitazawa, T.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 18 (6) 288-290 (1971) [3 ref. Ja, en]

The mp of 1335 samples of bar-style and stringy agars (apparent concn. 1.5% gel) was 74.5-95.0°C, average being 85.1°C. The mp and gel strength showed a possible correlation of high significance (>0.999). [See preceding abstr.] SKa

10 T 561
[Gelling strength of agar manufactured in Nagano. III. The variation in melting point and gelation temperature of the two groups of commercial agar processed from raw materials chiefly Argentinian Gracilaria and Japanese Gelidium species.]
Matsuhashi, T.; Kitazawa, T.; Takahashi, B.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 18 (6) 291-295 (1971) [11 ref. Ja, en]

Average mp and gelation temp. of 96 agar samples prepared mainly from Argentinian Gracilaria verrucosa were 79.3 and 38.7°C, while those of 152 samples consisting mainly of Japanese Gelidium spp. were 87.3 and 35.5°C. [See preceding abstr.] SKa

10 T 582
Meat sauce compositions.
Weese, D. G., de; Hanck, R. C. (SCM Corp.)
United States Patent 3 676 148 (1972) [En]

Meat sauce compositions contain gelatin and a crumb carbohydrate thickener adapted for rigid-form syneresis resisting refrigerated storage. IFT

10 U 680
The baking industries and EEC legislation. [Conference proceedings]
Axford, D. W. E.
Baking Industries Journal 5 (1) 18-22 (1972) [En, de, fr] [Flour Milling & Baking Res. Assoc., Chorleywood, Herts., UK]

This subject is discussed under the headings of: Types of harmonization; Stages in drafting EEC food legislation; Types of harmonizing legislation; Form of commodity laws; Labelling requirements; Optional harmonization; Aspects of legislation not yet harmonized; Present state of harmonization; Existing EEC legislation; Amending UK legislation; EEC legislation in draft; Draft regulation on flour; Draft directive on bread; Draft directive on biscuits and industrial flour confectionery; Preservatives allowed; Some labelling specifications; Draft directive on cocoa and chocolate; Draft directive on emulsifiers and thickeners; and Effects on baking industry in UK. OA

11 E 427
[Dehydration of fluid or viscous substances by microwaves.]
Torcol, J.; Bricout, J.; Menoret, Y. (Institut de Recherches Appliquees aux Boissons; Bureau d'Etudes, Recherches & Exploitation de Brevets)
French Patent 2 080 271 (1971) [Fr]

A homogeneous, dry or very slightly hydrated product is obtained by subjecting liquid or viscous substances, e.g. coffee, tea and colorants, to a microwave field of ≥850 MHz and a vacuum. The substance can contain 40-80% DM and its viscosity may be modified by thickeners, e.g. carbohydrates, sucroglycerides, carrageenans, gum arabic, pectinates, methyl cellulose, carboxymethyl cellulose, or proteins. It may be foamed with an inert gas before drying. In an example, 20 g of concentrated, sweetened, whole milk containing 70% DM (9% fat) are spread in a 1-2 mm film and heated for 5 min from a 400 W source at 20 Torr. Heating is then discontinued and a vacuum of <1 Torr maintained for 5 min. The expanded and porous product is crushed. The very light product dissolves well in water at 15°C. W&Co

11 H 1751
[Method for production of non-alcoholic beverages.]
Fisheris, L. E.; Benyushite, S. T.; Matsyunene, Yu. I.; Shlyazhene, Ya. A.; Lur'e, A. A. (**Union of Soviet Socialist Republics**, Eksperimental'no-Konstruktorskoe Byuro Ministerstva Pishchevoi Promyshlennosti Litovskoi SSR)
USSR Patent 317 371 (1971) [Ru]

In the manufacture of non-alcoholic beverages containing pectin, the gelling capacity of the pectin is reduced and beverage quality improved by first mixing the pectin with sugar and fermenting with pectolytic enzyme preparations to a syrupy condition, then evaporating to a DM content of 38-40% and mixing with aerated water. W&Co

11 J 1834
[Dehydration of vegetable extract.]
Bricout, J.; Menoret, Y.; Torcol, J. (**France**, Institut de Recherches Appliquees aux Boissons IRAB; **France**, Bureau d'Etudes Recherches et Exploitation de Brevets BEREB)
French Patent Application 2 077 976 (1971) [Fr]

A powder which is instantly soluble or micro-dispersible in water is obtained from a mixture comprising ≥10% by wt. of vegetable matter extract, e.g. the juice or pulp of strawberries, raspberries, blackcurrants, grapefruit, mandarin oranges or clementines, and ≤90% of a thickener comprising ≥1 glucide and, optionally, hydrophilic polymers. Alternatively, the extract may be an essential oil, e.g. essence of mint. This mixture is spread thinly on the bed of a microwave oven and subjected to a field ≥850 mHz and to a vacuum of ≤15 Torr. Examples relate to initial mixtures of 55-72% by wt. DM. W&Co

12 G 558
[Method for production of ready-to-eat first and second course dishes.]
Efimov, V. P.; Mineev, V. A.; Kotovich, A. G.; Ershova, A. A.; Kuznetsova, L. I.; Pupynina, V. D. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Konservnoi i Ovoshchesushil'noi Promyshlennosti)
USSR Patent 318 386 (1971) [Ru]

The starting materials are prepared, heat-treated in vacuo and broken down to a particle size of ≤4 mm. The particulate ingredients are then mixed together with a binder to form a homogeneous, viscous mass, which is packed into aluminium tubes and sterilized. Preparation of borshch (beetroot/cabbage/meat soup) is quoted as a typical application. W&Co

12 G 602
Dessert gels.
Moirano, A. L. (Marine Colloids, Inc.)
Canadian Patent 905 208 (1972) [En]

Improved gelling agents for aqueous desserts especially those containing fruit chunks comprising in combination calcium reacted low methoxyl pectin, locust bean gum, potassium-sensitive carrageenan or furcellaran, and calcium-sensitive carrageenan. IFT

12 G 608
Synthetic and artificial food. [A lecture]
Pike, M.
British Food Journal **74** (849) 101-102 (1972) [En]

Margarine is given as an example of an artificial food. "Artificial" low-calorie margarines are now being produced with up to 50% water by incorporating a thickener, or by using medium-chain triglycerides in place of natural fats. Artificial meat is made by extruding an alkaline dispersion of protein extracted from soy, sunflower seeds etc., through spinnerettes into a coagulating batch and stretching the fibres until the required toughness is attained. The fibres are then combined with fat, coloured and flavoured. Special treatments may be required depending on the meat imitated. Combinations of real and artificial meat are also possible. Artificial milk is made from soybeans by soaking them in water, homogenizing the slurry, inoculating it which a mixture of moulds including Aspergillus oryzae, incubating a few hours and then sterilizing and homogenizing again. Filled milk is manufactured from dried skim-milk, a vegetable fat and an emulsifier. PG

12 J 1929
Research and development creating extensive changes at all levels of industry.
Kitson, J. A.
Food in Canada 32 (2) 36-37 (1972) [En] [Food Processing Section, CDA Res. Sta., Summerland, British Columbia, Canada]

Plant breeding for mechanical harvesting.

improved crop production methods, new ways of storing and transporting processing crops, lower cost methods of waste treatment, improvement in canning and freezing equipment, increasing use of 4-5 oz easy-open cans, aseptic canning of fruit, and development of new thickeners, flavourings and colourings for convenience foods are cited as examples of recent research and development in the fruit and vegetable industry. PG

12 J 1997

The effect of certain chemicals on the colour and polysaccharides of strawberry puree.

Sistrunk, W. A.; Cash, J. N.

Food Technology 24 (4) 473-477 (1970) [17 ref. En] [Arkansas Agric. Expt. Sta., Fayetteville, 72701, USA]

The pigments in strawberry puree were stabilized with $SnCl_4$ in the pH range of 3.0-3.8. A reddish-brown pigment, extracted with 5% NaOH, was formed in greater quantities in the presence of Sn salts. The pH had the greatest effect on colour although holding time, ascorbic acid and formation of metal complexes were important factors. Ascorbic oxidation was more rapid at pH 3.0 than at 3.8 in the presence of Sn salts, while colour was more stable at low pH, which indicated that the breakdown of the 2 is not always directly related. The Hunter Color Difference Meter more clearly defined colour changes than other methods employed. There was an increase in water-soluble pectin, hemicellulose and cellulose during holding at 50°C. IFT

12 P 1799

[Alginates in the dairy industry.] Alginate in der Milchwirtschaft.

Bücker, J.

Deutsche Milchwirtschaft 23 (36) 1547 (1972) [De]

Advantages of fruit preparations containing alginates are discussed, approved emulsifiers, stabilizers, thickening and gelling agents listed and a formula for fruit yoghurt manufacture using an alginate is given. FL

12 P 1818

[Reversible freezing compositions.]

Compagnie Gervais-Danone

French Patent Application 2 085 528 (1971) [Fr]

A sorbet composition, which can be frozen and refrozen in a domestic refrigerator without deterioration, comprises water, 22-35% by wt. of sugar, a flavouring agent and 0.4-0.8% of an additive which imparts a viscosity >335 cP at 25°C (McMichael viscosimeter at 20 rev/min). This additive contains 1 or more of a carrageenate, an alginate, a pectin, starch, carob flour, guar flour and a natural gum. The product may contain N_2, Ar, H_2 or CO_2 bubbles in suspension. W&Co

12 P 1882

A method for producing sour milk drinks.

Exler, H.

British Patent 1 275 269 (1972) [En]

A method for the manufacture of cultured milk drinks involves pasteurization and acidification (biologically) of skim-milk, blending in an aqueous solution of citric acid and concentrated flavouring and then a mixture of pectin and sugar, homogenizing the mixture at 350-380 atm. at a temp. of 51-54.5°C, bottling the product and pasteurizing it at, e.g. 70-80°C for 20-30 min. Detailed examples for the manufacture of raspberry, strawberry, pineapple and Cola drinks are given. FL

12 T 640

Thickeners.

Courtaulds Ltd.

British Patent 1 280 150 (1972) [En]

Cellulose ether thickeners for foodstuffs having improved dispersibility and solubility in water are described. IFT

12 T 669

[Thickeners.]

Ajinomoto Inc.

Japanese Patent 24 133/72 (1972) [Ja]

Thickeners comprising corn starch slurries partially oxidized by reaction with hypochlorous acid or hypochlorite salts are described. IFT

12 T 696

[Edible coating for food products and process for its manufacture.]

Kuhlmann, R.

French Patent 2 087 185 (1971) [Fr]

A coating is obtained by forming a hot gelatin solution, e.g. in water, and adding ≥1 of: plasticizers, e.g. glycerine, sorbitol, glycols and sugars; thickeners, e.g. natural polysaccharides, gum arabic, algal derivatives and cellulose derivatives; emulsifiers and dispersants, e.g. mono- or diglycerides of stearic, palmitic, oleic and linoleic acids, mixed acetic and tartaric esters of fatty acid mono- or diglycerides and the reaction products of fatty acids with sorbitol; preservatives, e.g. antioxidants, yeast inhibitors and bacteriostatic agents; and lipid compounds, to reduce tackiness and hygroscopicity and increase the flexibility of the final coating. The composition is either formed into sachets or coated directly onto the food. A typical application is to sausages. W&Co

1 A 51

Studies of the properties of carbohydrate polymers. I. Intrinsic viscosity as a function of the characteristics of carbonate polymers.

Foda, Y. H.; Hamed, M. G. E.; Abd-Allah, M. A.

Sudan Journal of Food Science and Technology **4**, 74-80 (1972) [11 ref. En, ar] [Ain Shams Univ., Cairo, United Arab Republic]

Huggin's constant K was calculated after determination of the intrinsic viscosity of 1N KOH solutions (0.1. 0.2, 0.3, 0.4 and 0.5 volumes/100 ml) of starches from mango, corn, and rice, of glycogen, citrus pectin and inulin. JN

1 B 2

Extracellular microbial polysaccharides: new hydrocolloids having both fundamental and practical import.

Jeanes, A.

1140bn **164**: ORPL 82 (1972) [En] [N. Regional Res. Lab., 1815 North University Street, Peoria, Illinois 61604, USA]

The polyanionic heteropolysaccharide xanthan, produced from corn sugar by Xanthomonas campestris NRRL B-1459, is used as a thickening, stabilizing and suspending agent in foods. Fundamental and practical significance of this and various other hydrocolloidal, extracellular, microbial polysaccharides is discussed with reference to: viscosity and factors influencing it; rheology; water-binding capacity; compatability or interaction with organic solvent salts; and other polysaccharides; birefringence in stationary or flowing solutions; and molecular configuration and interaction of these macromolecules in "solution" or dispersion. AA

1 G 20

The grading of low-ester pectin for use in dessert gels.

Black, S. A.; Smit, C. J. B.

Journal of Food Science **37** (5) 726-729 (1972) [15 ref. En] [Dept. of Food Sci., Univ. of Georgia, Athens, 30601, USA]

Dessert gels made from a commercially available low-ester pectin were examined for firmness with a modified Sunkist Exchange Ridgelimeter and for breaking pressure using a Marine Colloids Gel Tester. Data are presented to show the effect of temperature, pH, pectin concentration, cooking time and calcium level on these two quality characteristics. Based on the data obtained a suggested grading procedure in terms of low-ester firmness (F) and low-ester strength (S) was developed. IFT

1 G 36

High protein pudding.

Duren, J. T. (Ralston Purina Co.)

United States Patent 3 689 288 (1972) [En]

Pudding compositions employ protein materials as thickening agents. An aqueous mixture of pudding ingredients having 3-15% by wt. protein is heated to 220-310°F to form a gel, and cooled to <100°F while subjected to mechanical working. The product has a consistency and texture similar to those of a starch pudding. IFT

1 G 60

Proceedings of the 26th Annual Meeting April 18-19, 1972. Theme: feeding the new military man.

[Conference proceedings]

USA, Research & Development Associates for Military Food & Packaging Systems Inc.

Activities Report **24** (2) iii+184pp. (1972) [many ref. En] [Room 554, 90 Church Street, New York, New York 10007, USA]

The meeting consisted of 3 main sessions: Food service for the soldier (pp. 8-62); What's new in food items (pp. 63-80); and Foods of the future for the military system (pp. 81-167), each session containing a number of papers. Papers include: Navy food service - the future is now, by A. S. Davis (pp. 19-25); New food products for the military man, by L. Allen (pp. 26-28); Trends of tomorrow in the food industry, by W. G. Karnes (pp. 29-36); Quality assurance of military subsistence, by M. R. Seymour (pp. 37-40); A summary and update of the experiment in central preparation at Fort Lewis, Washington, by R. S. Smith (pp. 41-42); Heating foods in modified atmospheres, by V. E. Sweat (pp. 47-54); Prospectus: convenience produce, by W. C. Hale (pp. 63-69); What's new and what's coming - packaging, by D. G. Mueller (pp. 70-73); Starch thickeners for today's needs, by R. R. Martin (pp. 74-76); Protein sources of the future - single cell, by B. Wolnak (pp. 104-124); Structured foods, by V. K. Wipf (pp. 125-131, 13 ref.); Role of the university in military feeding, by J. H. Mitchell Jr. (pp. 154-167, 27 ref.); Frozen beef menu items - a progress report, by W. M. Urbain (pp. 169-172); and Standards & controls for central food processing, by E. F. Caldwell (pp. 173-181, 10 ref.). JA

1 L 10

Sweetness perception in relation to some textural characteristics of hydrocolloid gels.

Marshall, S.; Vaisey, M.

Journal of Texture Studies **3** (2) 173-185 (1972) [24 ref. En] [Foods and Nutr. Dept., Fac. of Home Economics, Univ. of Manitoba, Winnipeg, Canada]

The apparent sweetness of five different hydrocolloid gels prepared with equal amounts of sodium Sucaryl varied significantly (P<0.01) when tested in a multiple paired arrangement by seven trained judges. Results from four replications consistently showed sweetness to be the greatest in carrageenan gels and the least in cornstarch gels. It was intermediate in low methoxyl pectin, agar and gelatin gels. Concentrations of gelling agents were selected to produce gels comparable in hardness. Characterization of mechanical textural properties with the GF-Zenken Texturometer showed that gels of cornstarch and gelatin were more cohesive, springy, chewy and gummy than those of agar, low methoxyl pectin and carrageenan ($P<0.01$). These findings suggested that gels which take more effort to disintegrate limit taste perception. Multiple regression analyses showed that the measured mechanical textural parameters accounted for 52.3% of the variability in sweetness scores suggesting that other characteristics may also play a role. Inspection of correlation coefficients of sweetenes with single textural parameters showed no one characteristic as a dominating influence over sweetness. [See also FSTA (1970) **2** 3L201.]   AS

1 L 50
[Highly hydrolysed starch derivatives as special thickening flour with protein content of 50% or more.] Hochaufgeschlossene Stärkederivate als Quell- und Spezialquellmehl Proteingehalt bis 50% und höher.
Anon.
Gordian **72** (9) 305-306 (1972) [De, en]

The use of high-protein thickening flours in invalid and reducing diets, infant foods and other food products is discussed. Special flours were developed with 40-50% protein (up to 80% denatured protein), water binding capacity 1:12 to 1:14, neutral flavour and satisfactory viscosity.   RM

1 S 121
[Storable, low-fat meat product in the form of a portion, and a method of production thereof.] Lagerfähiges fettarmes Fleischnahrungsmittel in Portionsform und Verfahren zu dessen Herstellung.
Marx, G.
German Federal Republic Patent Application 2 042 678 (1972) [De]

Disc-shaped meat portions are prepared by finely mincing (by wt.) 1 part lean beef and ½-3 parts pork fat, e.g. belly, with addition/kg mince of 5 g binder, 20 g salt, 2 g peppers, 1-2 g ground nutmeg and 10 g marjoram. The mince is mixed with at most an equal quantity of ice to give a loose consistency and make the meat juicy and tender, red dye, and frozen gravy containing (0kg) 5 g paprika extract, 10 g meat stabilizer, 7 g soya-based thickener, and preferably stock or soy sauce. To each part of this mixture are added ⅓-2½ parts (by wt.) coarsely minced, seasoned lean meat, e.g. pork, beef, or diced liver with liver seasoning, together with ⅓-2 parts (by wt.) diced onions roasted golden, and/or whole or chopped roasted mushrooms, preferably champignons or chanterelles. The final mixture is cooked in a closed tin in water at 60-95°C, preferably 80°C for approx. 1½ h, cooled to room temp. over approx. 3-4 h, removed, cut up into portions ~10-30 mm thick and weighing approx. 100 g, rapidly frozen to approx. -20°C, preferably -50°C, for storage up to 6 months, and then preferably vacuum-packaged. The product does not need to be thawed out, before frying.   W&Co

2 G 110
[Jelly pieces with liquid centres.] Geleestücke mit flüssigem Inhalt.
Beltman, H.
Gordian **72** (11) 386, 388 (1972) [2 ref. De] [Landwirtschaftliche Hochschule, Wageningen, The Netherlands]

The ability of methyl cellulose (MC) to solidify at high temp. and liquefy at low temp. is used for producing "artificial fruits". A solution of MC with a Ca salt ($CaCl_2$) is pumped through a heated pipe. At the pipe exit, cylinders of solidified MC are cut off and dropped into a cool solution of low-esterified pectin. Ca^{2+} ions freed from the surface of dissolving MC cause formation of a layer of solid pectin gel surrounding liquid MC. Any desired odour, flavour and colouring compound can be incorporated in the MC solution.   RM

2 T 93
[Food additives.]
Vitali, G.
Industrie Alimentari **11** (10) 73-84, 86 (1972) [26 ref. It] [Instituto Tecnica Commerc. "A Bordoni", Pavia, Italy]

The chemical composition of compounds added to foods deliberately or accidentally is reviewed under the headings: preservatives; antiseptic agents (aliphatic and aromatic acids, inorganic derivatives); antibiotics; antioxidants; gelling and thickening agents; emulsifiers; aromatic agents; colourants; enzymes; and sweeteners.   HBr

3 G 145
[3rd European Symposium: natural vegetable hydrocolloids.]
Societe Iranex
Revue des Fabricants de Confiserie, Chocolaterie, Confiturerie, Biscuiterie **47** (10) 20, 22-24, 26 (1972) [Fr] [13315 Marseille CEDEX 3, France]

The following lectures were given at a symposium organised by the Societe IRANEX at Marseilles in Sept. 1972; Some methods of identification of polysaccharides - GLC, mass spectroscopy by J. Artaud & J. M. Estienne; Carrageenates: structure and spatial conformation, by M. Quillet; Recent progress in the chemistry of acacia gums, by D. M. W. Anderson; Long-term feeding of gum arabic to the rat, by R. Jans; Emulsifying and interface properties of gum arabic solutions, by E. Shotton; Milk as an emulsion, by -. Keilling; The art and method of choosing a vegetable hydrocolloid and an emulsifier in food formulation, by -. Glicksman; Determination of the hydrophilic-lipophilic balance of classical emulsifiers and its importance, by -. Rimlinger; Study of viscoelastic behaviour of a hydrophilic colloid-sugar-water system, by C. A. Street; Aqueous gels of vegetable polysaccharides, by M. Quillet; Jellification and thickening of milk products, by C. Joubert; Utilization of natural vegetable hydrocolloids in special diets, by U. Jans; and Pharmacology of carrageenates, by W. Anderson. RM

3 J 482
[Seasoning of fermented soybeans.]
Chlorella Industries Co. Ltd.
Japanese Patent 41024/72 (1972) [Ja]

A seasoning composition suitable for fermented soybeans is produced by adding a mineral acid and an organic acid to soya, which is then combined with dextrin, disaccharides, salt, sugar alcohols, nucleotides, amino acids, and gum thickeners. IFT

3 T 187
[Pickle preservation.]
Ueno Seiyaku Co. Ltd.
Japanese Patent 43063/72 (1972) [Ja]

Pickles are preserved by packaging in a stable sorbic acid suspension containing a gum thickener. IFT

4 T 192
Polysaccharide gels. A molecular view. [Review]
Rees, D. A.
Chemistry and Industry No. 16, 630-636 (1972) [36 ref. En] [Unilever Research, Colworth/Welwyn Lab., Colworth House, Sharnbrook, Bedford, UK]

This review includes discussion of alginate gels and pectins. JN

5 L 348
[Place of modified forms and derivatives of starch in the food industry.]
Jancic, O.; Riskovic, O.; Dordevic, A.
Hrana i Ishrana **13** (7/8) 328-332 (1972) [25 ref. Sh, en] [Inst. za Heniju, Tehnologiju i Metalurgiju, Belgrade, Yugoslavia]

A summary and classification are presented of the various forms and derivatives of starch (e.g. hydrolysed, oxidized, soluble and phosphate starches). Their individual characteristics are compared with those of native starch and mention is made of their various applications in the food industry as thickening, stabilizing or binding agents. IN

5 L 403
[Viscosity of polysaccharides.]
Takahashi, T.
Annual Reports of the Food Research Institute Aichi Prefecture [Aichi-ken Shokuhin Kogyo Shikenjo Nenpo] **9**, 137-141 (1968, publ. 1969) [1 ref. Ja] [Food Res. Inst., Aichi Prefecture, Nagoya, Japan]

X mg of 7 polysaccharides (cellulose, rice straw xylan, soybean arabogalactan, Satsuma orange pectin, konjac glucomannan, beet pulp araban, and agar) were dissolved in 100 ml water, and theit inherent viscosity was expressed as $\eta_{sp} = bx^a$. The values of a were 1.00-1.40 and of -log b were 2.55-2.70. Konjac mannan showed the highest viscosity, followed by agar and then soybean arabogalactan (in cocn. of 1 g/l.). The addition of 1-2 g/l. NaCl, K_2HPO_4, and $CaCO_3$ produced no viscosity decrease, but the addition of SO_4^{2-} decreased the viscosity of agar but not that of konjac mannan. With the decrease of viscosity, the precipitated vol. of polysaccharides by centrifugation increased, especially of agar and soybean arabogalactan. HSu

7 T 346
[Gelatinizing agents and thickeners in the food and pharmaceutical industries. II. Methods of measurement of the viscoelasticity.]
Wozniak, J.
Bromatologia i Chemia Toksykologiczna 5 (1) 39-44 (1972) [13 ref. Pl] [Inst. Biofarmacji, Akad. Med., Warsaw, Poland]

9 G 446
[Thickener for batter and process for the production thereof.] Verdickungsmittel für Nasspanaden und Verfahren zu seiner Herstellung.
Roederer, H.; Kelch, C.; Marschke, H. (Maizena GmbH)
German Federal Republic Patent Application 2 136 636 (1972) [De]

Thickener for batter for frying fish or meat portions is produced by gelatinizing an aqueous dispersion containing approx. 20 - 45% by wt. natural or chemically modified starch, by subjecting it to mechanical or thermal treatment at <70°C, to obtain a Brookfield viscosity of approx. 1000 - 10 000 cP at 20°C. The viscosity may be varied by adding approx. 0.5 - 15.0% by wt. cold-swelling thickeners, e.g. starch, guar, ground carob bean kernels, and flavourings such as powdered egg or milk. The batter is very stable and not too hard, does not split, and may be coated on in quantities of 35 - 40%, does not detract from the flavour of the meat or fish or turn brown too easily. W&Co

10 G 515
[Study into conditions of gelation of low-methoxylated pectins.]
Sewer-Lewandowska, B.; Zdziennicki, A.; Zdziennicka, D.
Prace Instytutow i Laboratoriow Badawczych Przemyslu Spozywczego **22** (4) 483-502 (1972) [28 ref. Pl, ru, en] [Inst. Przemyslu Fermentacyjnego, Warsaw, Poland]

The effects of concn. degree of methoxylation, pH and Ca concn. on the gelation of various low-methoxylated pectins were evaluated. Best gelation was obtained with pectins containing 5.3-7.5% methoxy groups; pH significantly influences gelation. Pectin containing 1.8-7.4% methoxy groups requires 50 mg Ca/g pectin. STI

11 T 558
[Identification and determination of gelling and thickening agents in foods.]
Aerny, J.; Miserez, A.
Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene **64** (1) 139-151 (1973) [21 ref. Fr, de] [Service Federal de l'Hygiene Publique, Berne, Switzerland]

The difficulties of analysis of polysaccharides of high mol. wt. and the absence of specific identification reactions (except for starch and alginates) are discussed. Of the existing procedures, it is considered that best results are obtained by micro-electrophoresis on cellulose acetate. By using a boric acid:NaOH buffer at pH 10, polysaccharides with a negative charge migrate towards the anode, and when deposited can be revealed by colour reactions with Periodic acid-Schiff reagent (PAS), tannin-PAS or o-toluidine blue. Some thickening agents react only with one colour reagent, others with 2 or 3, others deposit badly on cellulose acetate or do not migrate. In addition, the same agent may vary in behaviour with origin or method of manufacture. Detailed studies were made of 8 samples of gum tragacanth, which gives a good PAS colour reaction. Solubilities in water after centrifugation varied from 30 to 90%, and reproducibility was poor. [Continued on following abstr.] ELC

11 T 559
[Identification and determination of gelling and thickening agents in foods.]
Aerny, J.; Miserez, A.
Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene **64** (1) 139-151 (1973) [21 ref. Fr, de]

[Continued from preceding abstr.] Migration distances on cellulose acetate varied from 13 to 20 mm, and measurements of specific surface and colour intensity differed between samples. Aqueous solutions could be reacted with anthrone, which gives a colour reaction with hexoses, and the extinction measured at 620 nm, but this could not be applied to foods containing natural hexoses. Thin layer preparation on Teflon were examined by IR absorption, and spectra are shown for starch, carob-, -guar, -tragacanth and -arabic gums, agar, carrageen, sodium alginate, methyl cellulose and carboxymethyl cellulose. Methods of extraction of thickening agents from confectionery and their identification by migration distances and tannin-PAS colour reactions are suggested. Thickening agents have some common features, including 2 unidentified components. ELC

12 E 436
[Frozen vegetables with thickening agents and frozen thickening agents for soups and borshch packed in retail packs.]
Gadzhiev, R. O.; Shornikova, N. M.; Sharoiko, E. M.
Konservnaya i Ovoshchesushil'naya Promyshlennost' No. 1, 10-11 (1973) [Ru] [Porechskii Konservnyi Zavod, USSR]

Vegetables (e.g. onions and carrots) for use in soups and borshch were fried in pork fat at 120-130°C, cooled to 20-25°C, packaged in polyethylene bags (capacity 1.3 or 5 kg) and frozen at -30 to -25°C. Thickening agents for soups and borshch are prepared in a similar manner. Recipes are given, together with an estimate of raw material consumption/t product. STI

ERNATIONAL FOOD INFORMATION SERVICE

ifis

FAB 42

THICKENERS AND GELLING AGENTS

SELECTED FROM VOLUME 6
FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

r the direction of

onwealth Agricultural Bureaux, Farnham Royal, Bucks; Institut fur Dokumentationswesen,
furt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties
ndbouwdocumentatie (Pudoc), Wageningen; Zentralstelle fur maschinelle Dokumentation—
furt am Main.

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES
ASSISTANT EDITOR

1

Apple press cake powder.
Bomben, J. L.; Guadagni, D. G.
***Food Technology in Australia* 25** (8) 414-415 (1973) [En] [USDA, Berkeley, California 94710, USA]

Apple press cake, a by-product of apple juice production, can be used to prepare an apple-flavoured thickener suitable for use in apple pies instead of starch. Pie fillings made with 2-3% press cake powder had satisfactory consistency and did not show any boil-out tendency, but the filling had a brownish colour and a slightly grainy texture which could cause problems. Pies made with press cake powder had a better flavour than those made with starch, and the addition of apple aroma concentrate increased the flavour. PG

2

Short-term peroral toxicity of undegraded carrageenan in pigs.
Poulsen, E.
***Food and Cosmetics Toxicology* 11** (2) 219-227 (1973) [24 ref. En, fr, de] [Inst. of Toxicol, Nat. Food Inst., DK-2860 Soborg, Copenhagen, Denmark]

Undergraded carrageenan, widely used as a texture-modifying food additive, was administered orally to pigs at levels of 0 (control), 50, 200 and 500 mg/kg body wt./day for 12 wk. No adverse effect on behaviour, growth or feed utilization was noted, neither were any significant changes in haematology or in blood and urine parameters. Changes in intestinal flora (total counts of aerobic bacteria in rectum and colon, and of lactobacilli in rectum) occurred and pigs given 200 and 500 mg carrageenan/kg showed a few focal areas with irregular surface. The slight changes in intestinal mucosa are not considered to be a significant toxic effect. There is therefore no evidence to suggest that adverse effects might result in man from the use of undegraded carrageenan as a food additive. VJG

3

Starch thickeners.
National Starch & Chemical Corp.
British Patent 1 329 882 (1973) [En]

Inhibited or crosslinked starch products for use as thickeners comprise the reaction product of an ungelatinized starch and a mixed carbonic-carboxylic anhydride of a polycarboxylic acid such as bisethylcarbonic adipic anhydride. IFT

4

[Preparation of highly viscous and jelly-like milk products: economic solutions.] Herstellung von hochviskosen und gelartigen Milchprodukten: Wirtschaftliche Problemlösung.
Buchwald, B.
Ernährungswirtschaft No. 7, 470-472, 477-478, 480-482 (1971) [De]

Processing steps and procedures in manufacture of highly viscous and jelly-like cultured milk products of the yoghurt type are discussed from the viewpoints of achieving consistency changes largely through acidification in the presence of small quantities of thickening agents, and ensuring a shelf life of several wk at temp. of approx. 15°C. Tabulations of technological requirements, work-flow sheets and diagrams are presented which are considered to afford practical solutions to technological specification requirements. It is pointed out that solutions to higher specifications are possible but less economic. SKK

5

[Investigations on microorganisms in thickening agents. I. Cell counts of aerobic microorganisms.]
Untersuchungen über Mikroorganismen in Verdickungsmitteln. I. Keimzahlen aerober Mikroorganismen.
Souw, P.; Rehm, H. J.
***Chemie Mikrobiologie Technologie der Lebensmittel* 2** (6) 187-193 (1973) [4 ref. De, en, fr] [Inst. für Mikrobiol., Univ., Münster, Federal Republic of Germany]

The microbiological contamination of vegetable thickening agents (gum tragacanth, gum arabic, karaya gum, carrageenan, alginate, guar flour and carob bean gum), most of which are permitted as food additives in the Federal Republic of Germany, was investigated with the following results. The total cell counts were considerably higher in thickening agents obtained by manual processing i.e. gum tragacanth, gum arabic and non-processed carrageenan (up to 4.7×10^8 cells/g) than in pretreated products like alginate, carob bean gum, guar flour and carrageenan powder. Gum tragacanth and carob-bean gum contained Staphylococcus aureus (coagulase-positive strains) (up to 0.3×10^6 cells/g). Escherichia coli was not present in any of the samples investigated. Streptococcus faecalis was present in some samples of gum tragacanth, carrageenan and guar flour (up to 0.5×10^7 cells/g). The influence of the microbiological state on the quality of thickening agents is discussed. AS

6

Health laws and regulations - Italy.
World Health Organization
***International Digest of Health Legislation* 24** (1) 168-177 (1973) [En] [Geneva, Switzerland]

A selection of Italian health laws and regulations is presented including the following which relate to food hygiene: Ministerial Decrees of 15 Dec. 1970, 3 May and 30 July, 1971, bringing up-to-date the Ministerial Decree of 31 March, 1965, relating to the control of chemical additives permitted in the production and preservation of foodstuffs and the Ministerial Decree of 22 Dec., 1967, relating to the control of colouring matters for use in foodstuffs (these decrees amend the list annexed to the decree of 31 March, 1965, and relate to preservatives, gelling and thickening agents, surfactants and substances for surface treatment); Ministerial Decree of 2 Feb., 1971, to amend the Ministerial Decrees of of 15 Jan., 9 May and 4 Aug., 1969, concerning the active principles and additives permitted for use in animal feedingstuffs; and Ministerial Decree of 3 May, 1971, embodying regulations concerning modified starches intended for human consumption.   VJG

7

[Properties and utilization of carrageenans as thickening agents.]
Snoeren, T.; Poll, J. K.
Officieel Orgaan, Koninklijke Nederlandse Zuivelbond **65** (51/52) 1242-1244 (1973) [3 ref. Nl, en]

The properties of carrageenans are discussed with particular reference to their use as thickening agents in vla and other dairy products and as gelling additives in such products as chocolate milk and milk puddings. IR spectroscopy of carrageenan preparations confirmed the hypothesis that differences in their milk reactivity were due to variations in $\varkappa$-carrageenan content: the spectra of the preparations with high milk reactivity were identical to those of $\varkappa$-carrageenan whereas the preparations with no milk reactivity appeared to consist entirely of λ- or iota-carrageenan. Results of preliminary studies suggested that the average mol. wt. of commercial carrageenan was correlated to their thickening capacity.   ADL

8

[Determining the jellying capacity of pectin.]
Buzina, G. V.; Sosnovskii, L. B.
Khlebopekarnaya i Konditerskaya Promyshlennost'
No. 6, 20-21 (1973) [Ru]

Methods of determining the jellying capacity of pectin must take into account the general character of the whole complex of pectin-sugar-acid jellies. The new method is based on preparation of an experimental jelly and on determining its strength properties. The article describes a method of determining the jellying capacity of pectin developed at the All-Union Scientific Research Confectionery Inst. which ensures max. utilization of the jellying capacity of sugar-beet pectin, and indicates the min. quantity required for production of a jelly of standard toughness.   STI

9

[Identification of jelling, thickening and binding agents in confectionery.] Nachweismöglichkeiten für Gelier-, Verdickungs- und Bindemittel in Zuckerwaren.
Benk, E.
Gordian **74** (1) 9-10, 12 (1974) [4 ref. De, en] [Chem. Landesuntersuchungsanstalt, Sigmaringen, Federal Republic of Germany]

Methods of identifying various carbohydrate confectionery additives are described including TLC of hydrolysed extract on cellulose powder and electrophoresis on cellulose acetate membrane film followed by IR spectroscopy. Component sugars and uronic acids of various thickeners are tabulated and IR spectrograms of tragacanth, gum arabic, methyl cellulose and carboxymethyl cellulose are reproduced.   RM

10

[Study of temperature of paste formation in wheat, corn and rice starch.]
El'-Farra, A. Kh. [El-Farrah, A. H.]; Auerman, L. Ya.; Maslova, G. M.
Prikladnaya Biokhimiya i Mikrobiologiya **9** (5) 740-743 (1973) [4 ref. Ru, en] [Moscow Tech. Inst. of Food Ind., USSR]

Microphotographic studies of the kinetics of paste formation by starch of wheat, corn and rice grown in the United Arab Republic and the USSR showed that temp. of individual stages of starch paste formation are lowest in wheat, higher in corn and highest in rice. It was also found that fine starch grains undergo paste formation at higher temp. than large ones. The Egyptian cereals differed from Soviet species in having larger starch grains, a higher amylose content in the starch and a lower temp. of paste formation.   AS

11

Industrial uses of cereals. [Symposium]
Pomeranz, Y. **(United States of America,** American Association of Cereal Chemists) (Chairman)
xxiii+483pp. (1973) [many ref. En]

[Continued from preceding abstr.] Cereal grains as a source of industrial energy, by D. L. Miller (pp. 252-258, 3 ref.); Industrial & agri-chemical utilization of corncobs, by D. I. B. vander Hooven (pp. 259-261, 2 ref.); Industrial use of corn starch, by C. R. Russell (pp. 262-284, 47 ref.); Corn proteins: potential for their industrial use, by R. A. Reiners, J. S. Wall & G. E. Inglett (pp. 285-302, 40 ref.); Industrial uses of dry-milled corn products, by R. J. Alexander (pp. 303-315, 35 ref.); A review of the physical properties, composition and structure of sorghum grain as related to utilization, by L. W. Rooney (pp. 316-342, 52 ref.); The U.S. starch-gluten industry and industrial utilization of wheat starch, by W. A. Carlson & J. D. Mullen (pp. 343-347, 7 ref.); Industrial uses of wheat gluten, starch, millfeeds and other by-products, by W. L. Gagen (pp. 348-365, 128 ref.); Total utilization of wheat, by M. F. Adams (pp. 366-370, 8 ref.); Industrial uses of barley, by Y. Pomeranz (pp. 371-392, 68 ref.); Industrial uses of cereals, oats, by E. F. Caldwell & Y. Pomeranz (pp. 393-411, 82 ref.); Rice hull utilization, by R. L. Roberts (pp. 412-417, 8 ref.); and Industrial utilization of cereals - annotated bibliography 1948-1972, by Y. Pomeranz (pp. 418-483, 2554 ref.).   JA

12

[Method for dry browning of flour used in food concentrates.]
Frumkin, M. L.; Grigor'ev, V. D.; Zhukova, V. M.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Konservnoi i Ovoshchesushil'noi Promyshlennosti **17**, 44-48 (1973) [Ru]

A new method and new equipment were developed for dry browning of wheat flour for use as a thickening agent in dried gravy concentrates. Browning is done in a fluid layer by IR radiation. Tests of the equipment and of the quality have indicated the advantages of this method as well as the possibilities for its wide application in the food industry. The equipment and the procedure are outlined. STI

13

Edible gums and related substances.
Lawrence, A. A.
Food Technology Review, Noyes Data Corporation No. 9, xii+339pp. ISBN 0 8155 0511 6 (1973) [En] Park Ridge, New Jersey, USA, Noyes Data Corp., Price $36.00

The information in this book is based on US patents since 1962, relating to the manufacture and application of edible gums and related substances. The Table of contents is organized in such a way as to serve as a subject index. Chapters included are: Galactomannans (pp. 3-33); Arabinogalactan (pp. 34-45); Gums from other land plants (tragacanth, tamarind polysaccharide, gum arabic etc.) (pp. 46-65); Pectins (preparation and uses) (pp. 66-97); Carrageenan-containing extracts from Gigartinaceae and Solieriaceae (pp. 98-128); Alginates (preparation, improving properties and uses) (pp. 129-164); Material from other marine sources (agar and Furcellaria extract) (pp. 165-175); Carboxymethylcellulose (pp. 176-206); Other cellulose ethers (pp. 207-233); Xanthomonas hydrophilic colloid (pp. 234-279); Other microbial polysaccharides (pp. 280-288); Cyclodextrins (pp. 289-311); and Miscellaneous gums (hydrophilic colloids, starch gels) (pp. 312-333). Company, inventor and patent number indexes are included. VJG

14

[Agar production.]
Matsuzaki, T.
Japanese Patent 4 843 627 (1973) [Ja]

Seaweed is immersed in an aqueous solution of a strong acid at a temp. of <20°C, followed by rinsing, neutralizing and boiling to extract the agar. IFT

15

[Stabilization of heat-sterilized mayonnaise and products based on mayonnaise.]
Gogusevic-Djakovic, M.; Janicek-Petrovic, S.
Tehnologija Mesa **14** (4) 111-114 (1973) [Sh, en] [Inst. za Prehrambenu Tehnologiju, Poljoprivredni Fak., Belgrade-Zemun, Yugoslavia]

The possibility of using stabilizing agents to achieve stability of mayonnaise-based products during sterilization by heat was studied. For sterilization tests 2 products used were salad with mayonnaise and chicken with mayonnaise. The meat:mayonnaise or vegetable:mayonnaise ration was 60:40. 3 stabilizing agents tested were a mixture of caruba gum with guar, alginate or agar-agar. Agar-agar was quite unsuitable. Emulsions to which the other 2 stabilizing agents were added displayed very good stability which was proportional to the stabilizing agent concn. Guar-caruba gum had the best stabilizing effects. STI

16

[Detection of thickening agents in beverages and ingredients.] Über Nachweismöglichkeiten von Verdickungsmitteln in Grundstoffen und Getränken.
Benk, E.
Mineralbrunnen **24** (3) 90-92 (1974) [4 ref. De] [Chem. Landesuntersuchungsanstalt, Sigmaringen, Federal Republic of Germany]

Method for detection and identification of thickening agents (agar, alginic acid, gum arabic, carrageenan, guar gum, locust bean gum, pectins, gum tragecanth, methyl cellulose and carboxymethyl cellulose) in beverages and beverage ingredients are discussed, including TLC, electrophoresis on cellulose acetate film, and IR spectrophotometry. AJDW

17

[Use of oxidized starch in fruit jelly manufacture.]
Zubrev, N. I.; Lur'e, I. S.; Luk'yanov, A. B.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 5, 20-21 (1973) [1 ref. Ru] [Moskovskii Tekh. Inst. Pishchevoi Promyshlennosti, USSR]

The possibility was studied of substituting gelling agents (agar, pectin and agaroid) by oxidized potato starch which may serve the purpose. The limitation is that gelling is slow and not sufficiently stable during storage. Therefore, agar or agaroid are often added to the oxidized potato starch. The effect of sodium alginate and agaroid on the structural and mechanical properties of oxidized starch jellies was investigated. The agaroid in "summer jelly" confectionery may be substituted by oxidized starch with the addition of sodium alginate. STI

18

Gum gelling system xanthan-tara dessert gel.
Glicksman, M.; Farkas, E. H. (General Foods Corp.)
United States Patent 3 784 712 (1974) [En]

A thermally-reversible, room-temp. setting gel resistant to either acid degradation or syneresis on lengthy heating is prepared from a mixture of xanthan and tara gums. The products can be used for fruit-flavoured, acid-type desserts or for use in canned puddings and the like. IFT

19

Carrageenan.
Anon.
Food Processing **35** (1) 71-72 (1974) [En]

The properties of carrageenan are briefly discussed. Product applications are listed and include, ice cream and ice milk, chocolate and other flavoured milks, whipped toppings, dry mix puddings and pie fillings, canned puddings, infant formulae, evaporated milk, flavoured cold milk powders, dessert gels, and coffee whiteners; details are given of the carrageenan level employed, its function and standardized functional properties for each of these products. Methods for testing the functional properties of carrageenan are outlined. AA

20

Changes in pectic substances of lemon albedo infected with Phytophthora citrophthora (R. E. Sm. & E. H. Sm.) Leonian.
Cohen, E.; Schiffmann-Nadel, M.
HortScience **8** (6, section 1) 513 (1973) [3 ref. En] [Inst. for Tech. & Storage of Agric. Products, Agric. Res. Organization, Volcani Center, Bet Dagan, Israel]

Infection by Phytophthora citrophthora, the causal agent of brown rot in citrus fruits, results in a firm rot, the texture of the infected fruit being somewhat more flexible than that of the uninfected. Changes in pectic substances in the albedo of lemon infected by P. citrophthora were examined. Comparison of pectic substances in infected and uninfected fruit showed that the sum total of all pectic fractions in fungus-infected albedo tissue remained almost unchanged but there were changes in individual fractions. The water-soluble fraction decreased considerably and the alkali-soluble fraction increased while the acid-soluble fraction remained unchanged. The change in the alkali-soluble pectic fraction may indicate some solubilization of the middle lamella between cells, and this could be responsible for some loss of firmness in the fruit. Since no changes were found in the acid-soluble fraction, it appears that no solubilization of cell walls occurred, and thus the infected lemon did not become soft. The decrease in the water-soluble fraction may be the reason why no disintegratation of infected tissue occurred. AA

21

Studies on the quality evaluation of apple jam.
Haq, M. A.; Ali, I.
Science and Industry, Pakistan **9** (3/4) 232-236 (1972) [4 ref. En] [Punjab Agric. Res. Inst., Lyallpur]

Apple jams available in the local market and 2 types of jam of standard quality with 45:55 and 50:50 fruit:sugar ratios, prepared in the Food Technology Laboratory, Lyallpur, were analysed for insoluble solids, total acidity, ash, alcohol precipitate, pectic acid content and total soluble solids. Interpretation of the results indicated that the market samples were of lower quality than those prepared in the laboratory, and did not contain the min. amount of fruit legally required. AA

22

[Crystallization of calcium carbonate in the presence of sucrose and pectin.]
Kharin, V. M.; Kosovtseva, A. V.; Ivashina, L. S.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 6, 151-154 (1972) [2 ref. Ru] [Voronezhskii Tekh. Inst., USSR]

In connection with the use of $CaCO_3$ for the purification of sugar diffusion juice, the effect of the sucrose and pectin usually found in the juice on the crystallization process and the $CaCO_3$ precipitate was determined by mathematical analysis [see FSTA (1973) 5 3L168]. It was established that the sucrose had little effect on the crystallization process, but did alter the composition of the precipitate, while presence of sucrose and pectin considerably reduced the crystallization rate and also altered the composition of the precipitate. HBr

23

Air-fluidized toasting of whole kernel wheat - processing variables and functional properties for food applications.
Lazar, M. E.; Mossman, A. P.; Wallace, J. M.
Journal of Food Science **39** (2) 239-243 (1974) [12 ref. En] [USDA, W. Regional Res. Lab., Berkeley, California 94710, USA]

Processing variables affecting toasted wheat properties were studied. For max. gelatinization of starch, substantial moisture, up to 60% of the wt. of the dry wheat, must be infused into the whole kernel and equilibrated prior to the heat treatment. Moistening, tempering and toasting optima were established. Cold paste viscosities can be reduced by over-toasting. as well as under-toasting. Heating rates must maximize starch gelatinization before moisture is evaporated. Enzyme inactivation, which affects storage stability as well as viscosity values, was not complete in 20 s at 300°F (mass-average kernel temp. 275°F) but was complete in only 15 s at 400°F (mass-average temp. 323°F). Toasting expands the kernel twofold or more and creates a porous endosperm structure which absorbs water readily. Several applications were tested, such as soup and sauce thickeners, breaders and cereals for domestic and foreign feeding programmes. IFT

24

Simplified solid-liquid separation in fermented foods.
Wick, E.; Graham, R. P.; Popper, K.
Food Engineering 45 (11) 122-123 (1973) [6 ref. En] [W. Regional Res. Lab., USDA, Berkeley, California, USA]

A reel method (WRREEL) is evaluated for solid-liquid separation of high solids materials, similar to that used to separate water from pectin gels [see Graham & Shepherd, Fd Engng (1959) No. 5, 69, 70]. Commercial coconut cream, after removal of coarse fibre by cheese cloth straining, was inoculated with yoghurt culture isolate (Lactobacillus bulgaricus) and after fermentation overnight at 116°F the material separated into oil + solids and an aqueous layer. The oil/solids gel was introduced into the slowly rotating reel (24 rev/h) and subjected to gentle agitation. A thin, close-weave cloth inside permitted passage of oil while rejecting particulate matter. The compacted spherical (¼-1 in diam.) solid matter retaining about 48% oil was easily pressed for further oil recovery. In a 2nd series of experiments skim-milk curd was separated from whey using the WRREEL leaving larger particles (53.7% moisture, 35.1% protein, 1.8% carbohydrate, 0.9% fat). SAB

25

[Powdered pectin.]
Bulgaria, Komitet po Kachestvoto, Standartizatsiyata i Metrologiyata
Bulgarian Standard **BDS 2608-72** 6pp. (1972) [Bg]

This standard replaces **BDS 2608-56** and covers powdered pectin produced from dried apple pomace and intended for food product gelling. Stipulated technological requirements and characteristics include the following common to the 3 quality grades recognized (differing in gelling strength): moisture, ≤8%; exterification, 65-80%; solubility, complete to form colloidal solution; insoluble admixtures, no tolerance; Fe, ≤3 mg/kg; Pb, ≤0.3 mg/kg; As, ≤0.2 mg/kg; pathogenic microorganisms, no tolerance. Regulations on packaging (in 40-kg plywood casks), labelling, sampling, analysis, storage (set at 12 months) and transport are listed. SKK

26

Alginates as food additives.
Wylie, A.
Royal Society of Health Journal 93 (6) 309-313, 315 (1973) [19 ref. En] [Alginate Ind. Ltd., Grangestone, Girvan, UK]

In this review-type paper the author discusses the production, structure, and properties of alginates, and outlines their application as thickening agents (e.g. sauces, syrups, cake batter, meat products etc.), gelling agents (e.g. jellies, milk desserts, pet foods etc.), for colloidal stabilization (e.g. homogenized milk, ice cream, cream cakes, fruit squashes) and for film formation (e.g. sausage casings). It is pointed out that since alginates are commonly used at very low concentrations in food products, their use has a relatively small effect on the total cost of the product. EJM

27

Chemical studies of pectin gelation. [Thesis]
Patrick, I. F.
84pp. (1973) [41 ref. En] Leeds, UK, Procter Dept. of Food & Leather Sci., Univ. of Leeds.

The components of pectin gels were studied by ultracentrifugation. In high centrifucal fields ≤59 000 g the gels separated into compacted gel and liquid fractions, the separation being aided by reduction of gel particle size and viscosity of the liquid. Various pectins of apple and citrus origin were studied, including a series with graded degree of methylation of the polygalacturonic acid, and the chemical and physical properties of the fractions were examined. The solid phase was 95-99% polygalacturonic acid with only small amounts of other sugar residues. The liquid phase differed considerably from parent pectin, particularly in containing a lower proportion of galacturonic acid. However, the degree of methylation had significant effects. High methoxy gels were stiffer, stronger and sedimented more easily. At low methoxy levels, the liquid phase carbohydrate moved closer to pectin characteristics, with a higher galacturonic acid content, lower neutral carbohydrates (especially glucose) and higher viscosity. The syneresis fluid exuded from stored non-centrifuged gels was generally similar to centrifuged liquid phase. ELC

28

[Ministerial decree of 22 June 1973. Revision of the ministerial decree of 31 March 1965 regarding control of permitted chemical additives for preparation and preservation of food. Implementation of the EEC directive of 13 July 1970 on antioxidants.]
Italy, Ministro per la Sanita
Bollettino dei Laboratori Chimici Provinciali 24

(4) L-257-L261 (1973) [3 ref. It]

A list of permitted antioxidants, gelling and thickening agents and waxes and resins for protecting the surface of citrus and other fruit is reproduced, together with permitted levels in a range of food products. RM

29

Preserving foodstuffs by mixing with thickening agent and cooling.
Muller, F. L.
New Zealand Patent 162 686 (1973) [En]

In preserving raw or partly heat-treated foods, self-sterilisation is caused by admixing with the unheated food 1 thickening agent having negatively charged molecules, and, if desired, other fermentation- inhibiting materials. The food is then stored at <10°C and the microorganisms present are destroyed through autolysis. A suitable agent is low esterified pectin mixed with 10-50% carrageenan, which is used in the form of a hot 5% aqueous solution. W&Co

30

Calcium concentration in apple fruit resulting from calcium chloride dips modified by surfactants and thickeners.
Mason, J. L.; McDougald, J. M.; Drought, B. G.
HortScience 9 (2) 122-123 (1974) [2 ref. En]
[Res. Sta., Agric. Canada, Summerland, British Columbia]

Fruits of 'Spartan' apple were dipped in solutions of commercial $CaCl_2$ after harvest to increase their Ca concn. Fruits were stored until the following June, then the flesh was analysed for Ca. Undipped fruit contained 203 ppm Ca and fruit dipped in 4% $CaCl_2$ (w/v) contained 278 ppm Ca, dry wt. basis. When surfactants were added to the $CaCl_2$ solution, the Ca concn. in dipped fruit was 230 to 250 ppm. When thickeners and surfactants were added, the Ca concn. in dipped fruit was 373 to 825 ppm. These results indicate that surfactants reduce the uptake of Ca by fruit from dips but thickeners with surfactants increase it. AS

31

[Production of gelling agents for low-sugar gels by acid deesterification of apple pectin in a heterogeneous medium.]
Krachanov, Kh. G.; Balakireva, B. N.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 19 (3) 81-90 (1972) [11 ref. Bg, ru, en]

Partial deesterification of apple pectin was effected in an ethanol:water:mineral acid medium. In comparative tests with HNO_3, HCl and H_2SO_4, HCl was found to give the best pectic gelling agents and H_2SO_4 to give the lightest. Under the experimental conditions, an increase in the concn. of the reaction mixture produced a decrease in the gelling capacity of the pectic preparation (at the same rate of esterification). The relation between the rate of esterification of apple pectin and its gelling properties, in relation to standard 65%-sugar gels and 50%-sugar ionic (Ca) gels was studied. The function was found to have its max. at an esterification rate of about 60%. On the basis of the results, a new method for obtaining partially deesterified apple pectin was developed. AS

32

[Ministerial decrees of 30 July, 1971, 9 May and October, 1972. Up-dating of ministerial decree of 31 March, 1965 on control of chemical additives permitted for production and preservation of foods.]
Italy, Ministro per la Sanita
Bollettino dei Laboratori Chimici Provinciali 24 (6) L532-L537 (1973) [15 ref. It]

The amended list of permitted preservatives (including antimicrobial and antioxidant agents), gelling and thickening agents, surface active agents and surface treatment compounds (sodium hypochlorite) is reproduced. RM

33

[Modern production of condensed soups.]
Moderne Hertellung konzentrierter Suppen.
[Lecture]
Kofahl, W.; Reichert, J. E.
Fleischwirtschaft 54 (5) 876-878, 880-881 (1974) [6 ref. De]

The production of thick, light-coloured condensed cream soups (e.g. cream of mushroom, cream of asparagus) is described under the following headings: the 'cold process'; emulsification and stabilization; binding and thickening agents; choice of ingredients for lightening colour; and sterilization. The effect of rotation and head-space on sterilizing time was investigated in a series of trials using 73 × 110 mm cans with 0.5 and 10% head-space. For stationary cans, sterilization time was reduced 3.3% with 5% head-space, 5.7% with 10% head-space, i.e. from 61.5 to 59.5 and 58.0 min respectively, at 117-117.5°C max. core temp. Rotation at 30 rev/min reduced sterilization time by 16.2, 35.3 and 49.1% to 51.5, 38.5 and 29.5 min at max. core temp. of 117.5, 119.0 and 122.0°C. The technology of production of condensed cream of mushroom soup by the cold process is set out in detail. RM

34

[Binding problems in sauce production.]
Bindeprobleme bei der Sossenherstellung.
Löcher, E.
Fleischwirtschaft 54 (5) 882-887 (1974) [De]
[Maizena Industrieprodukte GmbH, Hamburg,

Federal Republic of Germany]

The application of special starches for condensed clear soups and thick sauces and production of sauces for ready-to-eat dishes by conventional, continuous and cold-process methods are described. The viscosity characteristics of a number of native and modified starches are illustrated by Brabender and sterilization curves, including thick-boiling, thin-boiling, heat-stable, acid-stable, late-boiling and cold-stable starches. RM

35

[Fruit juice technology. A survey of current processes.] Fruchtsafttechnologie. Überblick über die gegenwärtig eingesetzten Verfahren.

Baumann, G.; Gierschner, K.

Ernährungswirtschaft No. 3, 126, 128, 133-134, 136-138, 140, 149-154 (1974) [De] [Univ. Hohenheim, Abteilung Gemüse- & Früchtetech., Federal Republic of Germany]

Aspects considered include: the importance of pectins, and enzyme treatment of the mash; the value of chemical analyses in technological studies; important stages in processing of fruit juices; suitability of sour cherry and blackcurrant varieties for juice production, and their processing; extraction of juice from enzyme-treated mashes; storage, filtration and packaging of fruit juices; and possible methods for separation of water from fruit juices. IN

36

Some physicochemical properties of starches as affected by changes in atmospheric pressure.

Morrow, L.; Lorenz, K.

Journal of Food Science 39 (3) 467-470 (1974) [11 ref. En] [Dept. of Food Sci. & Nutr., Colorado St. Univ., Fort Collins, 80521, USA]

4 types of starch (corn, rice, potato and wheat) were studied for their water-binding capacity and viscosity behaviour. Photomicrographs of starch suspensions were taken at 5 altitudes and temp. of 22°, 60°, 70°, 80° and 90°C. Measurements of the photomicrographs showed corn, potato and rice starch granules to increase in size on changing elevation from sea level to 10 000 ft. Wheat starch was not affected. Water-binding capacity increased for corn and potato starches as the altitude increased, but rice and wheat starches were not affected. The viscosity of corn, rice and wheat starch suspensions decreased initially with increasing altitudes but increased at the higher altitudes. The viscosity of potato starch suspensions did not change at increased elevations. IFT

37

The professional chef. [Book]

Folsom, L. A. (United States of America, Culinary Institute of America) (Editor)

4th edition 470pp. ISBN 0 8486 0571 5 (1974) [41 ref. En] Boston, Massachusetts, USA; Cahners Publishing Co. Inc. Price $19.95

This book provides a complete training course in the responsibilities and techniques of the modern chef. It contains >550 recipes, many of them illustrated. Photographs are also included showing plate arrangements, garnishes and food combinations. In this 4th edition, the lay-out of the recipes has been improved, and the directions clarified and revised. Chapters are: A chef is many things (p. 1); Food service occupations (pp. 2-3); Hygiene and sanitation (pp. 4-7); Tools and equipment (pp. 8-10); Safety (pp. 10-12); Food cost (p. 13); Converting recipes (p. 14); Appetizers (pp. 15-17); Beverages (pp. 17-19); Breakfast cookery (pp. 20-24); Dairy products (pp. 25-26); Rice and farinaceous products (pp. 26-28); Techniques for meat cookery (pp. 29-35); Beef (pp. 36-65); Lamb (pp. 66-77); Pork (pp. 78-88); Veal and variety meats (pp. 89-101); Poultry and stuffing (pp. 102-135); Fish and shellfish (pp. 136-170); Deep frying and breading (pp. 171-183); Vegetables (pp. 184-219); Salads (pp. 220-255); Salad dressings (pp. 256-262); Soups and stocks (pp. 263-308); Sauces and thickening agents (pp. 309-324). JA

38

Increased convenience, preparation options built into formulated gravy mixes.

Anon.

Food Product Development 8 (3) 12, 14 (1974) [En]

A current line of instant gravies produced by R. T. French Co., Rochester, New York, requires that the dry ingredients be sprinkled over hot water and stirred. The dry-mix gravies, Gravy Makins, utilize a unique precooked waxy maize starch system Dura Jel. Uniform consistency and freedom from lumps result from the application of this thickener system. There are 8 Gravy Makins on the market, each packaged in a foil envelope ranging in total wt. from 0.875 to 1.125 oz. An envelope makes 4 servings. VJG

39

Maine canner achieves quality standards with thin-to-thick food starch.

Anon.

Canner Packer World 143 (5) 26 (1974) [En]

A food starch, called Thin-N-Thick 99, characterized by a controlled thin-to-thick viscosity change during cooking, thereby allowing greater heat penetration into the product involved, has been successfully used to circumvent problems involved in the batch canning of blueberry pie fillings arriving at the canners in the frozen state. The new starch permits the required can centre temp. of 193-195°C without detrimental effect on the fruit. The low pH (3.2-3.5) of the fruit did not present any problems. HBr

40

Studies on the starch of Dioclea violacea.
Rosenthal, F. R. T.; Pelegrino, S. L.; Mello, A. P.; Silva, S. M. O.
Stärke **26** (7) 243-248 (1974) [22 ref. En, de, fr]
[Lab. de Amido, Inst. Nacional de Tecn. Av. Venezuela, 86 Guanabara, Brazil]

The properties of starch from seeds of D violacea were studied. The starch comprises 49% of seed DM and resembles starches from other leguminosae in solubility, swelling and viscosity patterns, but resembles corn starch in gelatinisation temp. It forms thick, stable, non-cohesive pastes and these characteristics make it suitable for use as a thickening agent, e.g. for soup and salad dressings. The formation by retrogradation of gelatinized pastes of an opaque and rigid gel suggests its use for preparation of instant desserts. RM

41

[The nature of highly hydrolysed starch.] Die Natur hoch aufgeschlossener Stärken.
Aberham, H.
Gordian **74** (7/8) 256 (1974) [De]

The properties and applications of gelatinized special starches are reviewed. A double heat treatment used to hydrolyse amylopectin and expose the amylose part of the starch molecule allows production of starches with varying gelatinizing and viscosity properties which are able to form stable gels during cooking, autoclaving or freezing, even at low concn. RM

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H. BROOKES

ASSISTANT EDITOR

1

[Method for determination of the number of carbonyl groups in acidulated starches.]
Zubrev, N. I.; Lur'e, I. S.; Luk'yanov, A. B.
Sakharnaya Promyshlennost' **47** (7) 68-70 (1973)
[6 ref. Ru] [MTIPP, USSR]

A method for determination of carbonyl groups using potassium ferrocyanide is described. A relationship is given between the acidulation rate as expressed by the number of carbonyl groups and the structural and mechanical properties of acidulated starch pastes. STI

2

Food additives. Gum tragacanth; proposed affirmation of GRAS status with specific limitations as direct human food ingredient.
United States of America, Food & Drug Administration
Federal Register **39** (185, Sept. 23) 34207-34209 (1974) [En] [Washington, DC, USA]

The toxicological literature on the title compound (i) has been searched since 1920, 159 abstracts were reviewed, and 17 pertinent reports are summarized in a literature review available from the National Technical Information Service (NTIS). A summary of the review is given which leads to the conclusion that (i) may be affirmed as GRAS at max. levels of 0.2-1.3% as an emulsifier, stabilizer, thickener, and flavouring agent and adjuvant in specified foods. CAS

3

Food additives. Sterculia gum (karaya gum); proposed affirmation of GRAS status with specific limitations as direct food ingredient.
United States of America, Food & Drug Administration
Federal Register **39** (185, Sept. 23) 34209-34211 (1974) [En] [Washington, DC, USA]

The toxicological literature on the title compound (i) has been searched, 73 abstracts were reviewed, and 17 pertinent reports are summarized in a literature review available from the National Technical Information Service (NTIS). A summary of the review is given which leads to the conclusion that (i) may be affirmed as GRAS at max. levels of 0.002-0.3% in specified foods as a stabilizer and thickener. CAS

4

Food additives. Locust (carob) bean gum; affirmation of GRAS status with limitations as direct human food ingredient and affirmation of GRAS status for indirect human food use.
United States of America, Food & Drug Administration
Federal Register **39** (185, Sept. 23) 34181-34184 (1974) [En] [Washington, DC, USA]

Locust (carob) bean gum is primarily the macerated endosperm of the seed of the locust (carob) bean tree, Ceratonia siliqua (L.), a leguminous evergreen tree, with lesser quantities of seed coat and germ. It is affirmed as generally recognized as safe (GRAS) under the Federal Food, Drug and Cosmetic Act when used at the following max. levels as a stabilizer and thickener: baked goods and baking mixes, 0.15%; non alcoholic beverages and beverage bases, 0.25; cheeses, 0.8; gelatins, puddings, fillings, jams and jellies, 0.75; and all other foods, 0.5. The technical grade, containing greater amounts of seed hull and embryo, is affirmed as GRAS when used or intended for use as a constituent of food-contact surfaces. CAS

5

[The effect of various additives on the properties of edible swelling starches.]
Koptelova, E. K.; Zhushman, A. I.; Popova, N. M.
Sakharnaya Promyshlennost' **47** (1) 55-59 (1973)
[6 ref. Ru] [VNIIK, USSR]

Swelling starch produced from a suspension dried on a roller dried and used as a thickening agent in food products has several disadvantages, which may be eliminated using various methods which are briefly discussed. Results of analyses of initial starch samples are presented together with analyses of swelling starches for appearance, colour, odour and swelling capacity in cold water and paste formation. Following mixing with cold water, transparency was achieved with suitable consistency, odour and flavour for the products produced, and the further ability to mix with milk and fruit juices. Results of sensory evaluation of swelling starches used for various purposes (additions to other starches, carbohydrates, rising agents, electrolytes and fats) are given. STI

6

[Study of cream structure in relation to cream treatment before churning.]
Kacherauskis [Kacerauskis], D.; Bronyukaitene [Broniukaitiene], N.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti **8**, 111-129 (1973)
[28 ref. Ru, li, en] [Vil'nius, USSR]

In the first few minutes after separation and cooling to its holding temp., cream viscosity remained constant; thereafter it increased progressively for at least 16 h, (the duration of the experiments). The extent of thickening depended on the fat content of the cream, the pretreatment and the temp. of holding. With high fat cream (>30%) the optimum temp. is around 10°C, but with cream of low fat content, the optimum temp. may be as high as 20-25°C. This is attributed to the fact that the casein, whose Brownian motion increases with temp., plays a more important role as the fat content decreases. Cream ripened by the addition

of starter showed a rapid increase in viscosity after the acidity had reached a critical value around 0.30-0.33%. The thickening in this case is attributed mainly to the presence of free fat. JHP

7

[Gel desserts.]
Aoba Kasei Co. Ltd.
Japanese Patent 4 934 823 (1974) [Ja]

Carrageenan, sodium alginate and water are heated to form a clear solution which is then cooled to form a gel. The product is immersed in a calcium-containing solution, whereby up to 50% of the sodium ions are replaced by calcium by diffusion. The product is then immersed in a low pH seasoning solution. IFT

8

[Physical properties of starch granules and their uses.] [Lecture]
Takahashi, R.
Journal of the Japanese Society of Starch Science [Denpun Kogyo Gakkaishi] **21** (1) 51-60 (1974) [6 ref. Ja]

9

[Structure and physical properties of starch.] [Lecture]
Hizukuri, S.
Journal of the Japanese Society of Starch Science [Denpun Kogyo Gakkaishi] **21** (1) 61-69 (1974) [24 ref. Ja]

10

Pie thickener from apple wastes.
Anon.
Food Production/Management **97** (5) 28 (1974) [En]

The use of apple peels and cores from processing plants, known as press cake, as a thickening and flavouring ingredient for apple pie fillings is discussed. Processing of the press cake powder consits of collecting the peels and cores under sanitary conditions, separating out seeds and stems, macerating, pressing, drying and finally grinding the press cake into a fine powder. More apple aroma can be added to the press cake powder by adding high concentrate (10 000 fold) apple aroma which is produced from the juice pressed from peels and cores. AA

11

[Changes in the properties of potato starch during the production of ready-to-serve jellies.]
Dremina, N. V.
Konservnaya i Ovoshchesushil'naya Promyshlennost' No. 7, 30-31 (1974) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Konservnoi i Ovoshchesushil'noi Promyshlennosti, USSR]

Modified potato starch is used for the manufacture of concentrated jelly, which can be reconstituted in cold water. Native starch is gelatinized in a boiling pan and then dried on a roller drier. The dynamic viscosity of 1.5% starches was determined by means of a Höppler viscometer; the viscosity of native starch was 0.988 Pa and 0.095 Pa for modified starch. The presence of organic acids in jelly prepared with apple puree (pH 3.3) may result in starch hydrolysis. Nevertheless at 4% starch concn. a sufficiently firm jelly is formed at 22 ± 3°C. To prove depolymerization, adsorption on a column (Al_2O_3) was used and amylose and amylopectin, or possibly their fission products were manifested by different colours with iodine solution. The swelling starch in the jelly becomes more digestible due to depolymerization and acidity. STI

12

[Application of modified starches as a partial substitution for agaroid in jelly production.]
Lavrova, L. G.; Zubrev, N. I.; Lur'e, I. S.; Luk'yanov, A. B.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 7, 18-19 (1974) [Ru] [Moskovskii Ordena Trudovogo Krasnogo Znameni Tekhnologicheskii Inst. Pishchevoi Promyshlennosti, USSR]

A partial substitution for agar in making jellies is possible only when the starch quality index is known can be quickly determined and correlates with the gelling properties. In starches of different oxidation grades and, consequently, different gelling properties, the starch/agar ratio must be selected to obtain a mix with both proper gelling rate and economy. Experimental detn. was made of the overall quality index of oxidized starch, i.e. the number of carbonyl compound groups/starch paste optical density ratio; the optimum index value ranges between 2 and 3.4. A graph was constructed to calculate the optimum agar/starch ratio in the jelly. STI

13

[The use of carageenans in the manufacture of semi-perishable canned meat products.]
Panin, J.; Polic, M.; Dordevic, M.
Tehnologija Mesa 15 (3) 82-84 (1974) [2 ref. Sh, en] [Jugoslovenski Inst. za Tehnologiju Mesa, Belgrade, Yugoslavia]

Studies on the use of carageenans as a substitute for gelatin in pasteurized canned meat products are discussed; results showed that carageenans can be used at concn. ≤0.3%, higher concn. giving a bitter off-flavour in the product. STI

14

Carrageenan: functional properties and application in food.
Pedersen, J. K.
Cereal Science Today **19** (10) 471-476 (1974) [2

ref. En] [Dept. of Res. & Development, The Copenhagen Pectin Factory, Lille Skensved, Denmark]

Aspects of the topic considered are: molecular structure; solubility; gelation; gel strength; gelling and melting temp.; syneresis; transparency; protein reactivity; selection of the gelling agent; and gel texture. Carrageenan has 2 important properties; strong protein reactivity and extremely versatile gel texture, thus lending itself to tailormaking of gel textures. Before tailormade gel textures become a reality, a universally accepted 'texture characterization language' must be developed. VJG

15

The application of psychophysics to the food industry with special reference to the textures of liquid foods and gels. [Conference proceedings]
Wood, F. W.
IV International Congress of Food Science and Technology **3**, 49-51 (1974) [En] [Unilever Res. Lab., Colworth/Welwyn, Sharnbrook, Bedford, UK]

Psychophysics is the study of the relationship between physically determined and sensorily appreciated quantities. Measurement of the viscosity of liquid foods is discussed and particular emphasis given to the correct operating procedures to be adopted in the assessment of non-Newtonian liquids. A study of the relationship between the rheological characteristics of liquids and their corresponding sensorily evaluated consistencies leads to a better understanding of creaminess and other mouthfeel characteristics. Measurement of gel texture is discussed. Measuring principles enabling a good correlation between various types of sensory gel texture assessments, e.g. by shaking, the "finger test" and biting are detailed. In general those methods which only deform a gel mass correlate with finger gel strength, deformability and brittleness in the mouth. Methods which break the gel correlate with gel strength in the mouth. AS

16

Microscopic observations of cassava and yam starch gelatinization and enzyme suscetiptibility. [Conference proceedings]
Park, Y. K.
IV International Congress of Food Science and Technology **2**, 42-43 (1974) [En] [Caixa postal 1170, Univ. Estadual de Campinas, Fac. de Tecnologia de Alimentos, Campinas, Sao Paulo, Brazil]

Gelatinization temp. of cassava and yam starch was studied microscopically. Large granules of cassava and yam starch were gelatinized first at 52° and 58°C respectively, and small granules at 58° and 70°C respectively. The susceptibility of bacterial α-amylase to cassava starch was due to the low gelatinization temp. AL

17

The rheologic quality of pastes. [Conference proceedings]
Zajac, P.
IV International Congress of Food Science and Technology **1a**, 74-76 (1974) [En] [Dept. of Food Chem. & Tech., Fac. of Chem., Slovak Tech. Univ., Bratislava, Czechoslovakia]

Delayed swelling and extension of the gelatinization range of starch granules by various mono- and disaccharides is reviewed. The effects of low pH produced by fruit juices or other ingredients on starch breakdown, low viscosity and thinning, and the advantages of cross-linked starches are discussed. ELC

18

[Obtaining cation forms of agaroids.]
Stavrov, S. N.; Gulya, A. P.; Iorga, T. P.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 39-42 (1974) [5 ref. Ru] [Kishinevskii Ordena Trudovogo Krasnogo Znameni Gosudarstvennyi Univ. im. V. I. Lenina, USSR]

A method of obtaining cation forms of agaroids [agaropections?] under laboratory conditions is proposed. Agaroid salts obtained had the same mol. wt. and the same content of acidic (ester sulphate) groups. For water jellies of K-, Ca- and Ba-agaroids at concn. above 6-7%, inversion of a number of cations was observed. This accounted for the effect on the gelling ability of agaroid, compared with jallies of concn. <6%. Solubility of agaroid and its cation forms depended on its structural pattern. In respect of solubility, agaroid salts may be arranged in order of reducing solubility: Li- Na - K - Ca - Ba. STI

19

Manufacture of low-fat dairy spreads. [Conference proceedings]
Antila, V.; Kankare, V.
XIX International Dairy Congress **1E**, 676-677 (1974) [En] [St. Inst. for Dairy Res., Jokioinen, Finland]

Tests were carried out on the effects of gelatinizing agents on the stability of a basic low-fat dairy spread mixture containing: 17.8 kg cream (45% fat), 0.4 kg dried buttermilk, 1.6 kg cream starter, 0.18 kg salt, and 8 ml of a 1.5% aqueous solution of β-carotene. The mixture was divided into 3 parts and (i) 0.5% gelatin, (ii) 0.5% sodium carboxymethylcellulose, (iii) no gelatinizing agent added. The preparations had pleasant taste, good consistency and spreadability at all temp., and kept well at room temp., although some whey exuded from (iii). AL

20

[A continuous diffusion method used to obtain agaroid from Black-sea Phyllophora spp.]
Boidyk, N. M.; Kaganovich, E. B.; Firsov, A. G.
Rybnoe Khozyaistvo No. 9, 63-64 (1974) [Ru]
[Odesskoe Otdelenie AzcherNIRO, USSR]

A continuous diffusion method for extraction of agaroid from Phyllophora spp. is described. Extraction is conducted at 93-98°C for 6-8 h; extract concn. is 1.7-2.5%. Agaroid produced by this method has better gelation properties and a lower concn. of impurities than that produced by the normal method. The process can also be used with Furcellaria spp. STI

21

Modified starches for the food industry.
Howling, D.
Food Technology in Australia 26 (10) 464-467, 469, 471, 473 (1974) [11 ref. En]

Basic structural and paste characteristics of starches are considered. Modification of their basic structure by physical and chemical methods to increase their field of application is discussed. Preparation and utilization of physically modified starches (pregelatinized starches and thermal modification by dextrinization) and chemically modified starches (acid-thinned starches, maltodextrins, oxidized starches, esterified and etherified starches, distarch derivatives, mono-starch derivatives) are described. VJG

22

[Hydrophilic gelling agent.]
Hamada, K.
Japanese Patent 4 937 194 (1974) [Ja]

A hydrophilic gelling agent for foods including oils comprises the reaction product of vanillin and a hexahydric alcohol. IFT

23

[Study of gelatinization of agar gels by electrical conductivity measurement.]
Kudashova, R. V.; Aver'yanova, V. M.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 2, 95-98 (1974) [15 ref. Ru] [Saratovskii Gosudarstvennyi Univ. im. N. G. Chernyshevskogo, USSR]

Since the agar used for preparation of reversible gels is by its nature a polyelectrolytic substance, measurement of electrical conductivity can advantageously be used to follow the structural changes occurring during the gelatinization and liquefaction of agar solutions (1-6%) at temp. of 5-68°C. This method allowed very precise detn. of the temp. of liquefaction and gelatinization at diferent concn. The measurements showed that phase changes in agar are complex processes involving a large number of successive structural alterations. STI

24

A note on the gelation behavior of thiolated polyvinylalcohol as a model compound for foodstuffs.
Kuniori, T.; Nishiyama, J.; Matsumoto, H.
Journal of Nutritional Science and Vitaminology 20 (1) 59-69 (1974) [13 ref. En] [Osaka Women's Univ., Tezukayama, Sumiyoshi-ku, Osaka, Japan]

An attempt was made to use thiolated polyvinylalcohol (SH-PVA) for studying the role of SS linkage on the physical properties of foods and proteins. An aqueous solution of SH-PVA of concn. ≥3% gelated on treatment with bromate within 10 min. The gel was analysed by the creep test on the basis of a mechanical four element model and was found to exhibit the property of non-linear viscoelasticity. The mechanical parameters of the gel were comparable to those of the agar gel. Change in the solubility of SH-PVA during oxidation were not parallel to the extent of the formation of SS linkages. Molecular behaviour of the polymer was investigated in relationship to oxidation conditions. Oxidation at a concn. of 0.4% at pH 5.0 brought about a slight decrease in viscosity, while there was no change in the gel filtration pattern as compared with control. At the concn. of 2% the oxidation resulted in 1.5 times-increment in viscosity. This agreed with the data of gel filtration. This study provides more definitive evidence on the role of SS linkage on the gel structure. AS

25

[Effect of multiple precipitation on apple pectin properties.]
Moiseeva, V. G.; Zaiko, G. M.; Tikhenko, T. M.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 78-81 (1974) [8 ref. Ru] [Krasnodarskii Politekhnicheskii Inst., USSR]

Some effects were observed during multiple precipitation of industrial pectin from aqueous solutions by ethanol:increases in free carboxyl groups, purity and solubility of the preparation, and free galacturonic acid content; decreases in total ash, average mol. wt., methoxyl groups and gelling ability. The amount of saccharides and amino acids decreased with increasing number of precipitations, but the gelling ability of the pectin preparations decreased. STI

26

[Relationship of quality of dehydrated potato puree to chemical composition of potatoes.]
Vecher, A. S.; Golynskaya, L. A.; Snyatkov, A. S.
Konservnaya i Ovoshchesushil'naya Promyshlennost' No. 8, 15-16 (1974) [4 ref. Ru] [Inst. Eksperimental'noi Botaniki imeni V. F. Kuprevina AN BSSR, USSR]

Contents of DM, total N, amino acid N, non

protein and protein N, total pectin, cellulose and hemicellulose, and ratio of hemicellulose and total pectin to DM were determined. Early varieties contained more non protein N than late potato varieties. Asparagine and glutamine content varied according to potato variety and were indirectly related to non protein N. Their content particularly in the initial storage period may together with alpha-amino acids affect the quality of dried potato puree. Varieties containing a high % of tyrosine and phenolic compounds yielded a poorer quality product than varieties with a lower content of these compounds. High polyphenols content resulted in intense enzymatic darkening of tubers as well as products. Late varieties had a lower content of phenolic compounds and tyrosine and also a lower polyphenoloxidase activity than early varieties. Varieties possessing lower pectin content and more starch were readily overcooked and more mealy. Cellulose content did not appear to have any effect on the culinary properties of dried potato puree. STI

27

Effects of concentration on the viscosity profile of cassava starch pastes during the cooking-cooling process.
Odigboh, E. U.; Mohsenin, N. N.
Journal of Texture Studies 5 (4) 441-457 (1975) [14 ref. En] [Dept. of Agric. Eng., Pennsylvania St. Univ., University Park, Pennsylvania 16802, USA]

Raw cassava starch, dried at 50°C, was cooked at 4 concn. in the Stormer viscometer modified in such a manner that the viscosity measurements were made under conditions satisfying the requirements of theoretical viscometry. The measurements provided rheological data usable in engineering design problems involving mixing, heat transfer or transport of the pastes. Viscosity and yield stress of the pastes were measured at 5°C intervals through the cooking-cooling process. Plots of viscosity values vs. cooking-cooling temp. and time yielded viscosity profiles for different paste concn. The results showed that paste concn. have pronounced effects on the magnitude of viscosity values, the rate of viscosity rise to the peak value, the time and temp. of this peak, the paste shear-thinning tendency and the extent of retrogradation on cooling. AS

28

[Production of pectin from potato starch pulp and its possible importance for the potato starch industry.] Pektingewinnung aus Kartoffelpülpe und ihre mögliche Bedeutung für die Kartoffelstärkeindustrie. [Lecture]
Abousteit, O.; Kempf, W.
Stärke 26 (12) 417-421 (1974) [16 ref. De, en, fr] [Bundesanstalt für Getreideverarbeitung, 4930 Detmold 1, Schützenberg 12, Federal Republic of Germany]

A crude pectin was prepared from potato starch pulp by hydrolysis with HCl at pH 3.3, 2 atm pressure and 134°C for 1 h. This produced a 55% (g/100 g dry pulp) yield of approx. 35:65 pectin-starch mixture. Hydrolysis at atm pressure, pH 3.0, ≤60°C for 10 h produced 21.41% of low starch pectin, with 0.4% crude protein (DM basis). Residual starch could be removed from a pectin solution either by tannin precipitation or by saccharification to a pectin-sugar solution which could be directly used. A dry pectin powder could be obtained by ethanol precipitation. RM

29

[Improved process for the manufacture of carrageenan.]
Boidyk, M. N.; Zambriborshch, R. F.; Mikulich, D. V.; Kaganovich, E. B.; Firsov, A. G.
Rybnoe Khozyaistvo No. 10, 69-70 (1974) [Ru] [Odesskoe Otdelenie AzcherNIRO, USSR]

Possible improvements in the manufacture of agaroid (carrageenan) from Black sea Phyllophora spp. were studied. An improved extraction process was developed, based on boiling the seaweed with 0.6% alkali (dry wt. basis) at a seaweed:water ratio of 1:15. Activated C is used for clarification of the extract. The yield of carrageenan was increased by 18%, without adverse effects on gelatin capacity. STI

30

Starch thickeners.
Szymanski, C. D.; Tessler, M.; Bell, H. (National Starch & Chemical Corp.)
United States Patent 3 857 976 (1974) [En]

The patent covers a retortable food product containing a starch thickener in which a substantial portion of the starch is an epichlorohydrin cross-linked hydroxypropyl cereal starch. IFT

31

Rheological properties of starch pastes.
Schutz, R. A.
Dechema-Monographien 77, 269-281 (1974) [12 ref. En, de, fr] [Ecole Superieure des Ind. Textiles, Mulhouse, France]

The use of a coaxial cylinder rheometer to characterize a finished homogeneously gelatinized starch paste is discussed. AS

32

[Powdered pectin production by the combined procedure of alcoholic precipitation and spraying.]
Sulc, D.; Vujicic, B.; Bardic, Z.
Zbornik Radova, Tehnoloski Fakultet, Novi Sad 4, 215-224 (1973) [19 ref. Sh, en] [Tehnoloski Fak., Novi Sad, Yugoslavia]

A combined procedure for powdered pectin production from pectin extracts by alcoholic precipitation and spraying has been developed. This procedure has given a relatively high pectin yield of

quality, as judged by degree of purity, relative mol. wt. and gelling capacity, much higher than that of pectin obtained by spraying and a little lower than that of alcohol-precipitated pectin. The new procedure was twice as efficient as spraying and 1.3 × as efficient as alcoholic precipitation. The combined procedure can be recommended for industrial production of powdered pectin. AS

33

Gel characterization with the Weissenberg rheogoniometer: application to carrageenan gels.
Elliott, J. H.; Ganz, A. J.
Journal of Food Science **40** (2) 394-398 (1975) [14 ref. En] [Coatings & Specialty Products Dept., Res. Center, Hercules Inc., Wilmington, Delaware 19899, USA]

A technique was developed, using the Weissenberg rheogoniometer, to obtain max. information from a single gel preparation. Initially, dynamic measurements were used to follow rate of gel formation and to obtiain essentially undisturbed gel properties. Next, subjecting the gel to steady shear permitted determination of the modulus, the stress and strain at breakdown, the excess work of breakdown and the viscosity of the broken gel. Finally, the rest properties of the broken gel, including structure buildup, were determined dynamically. These techniques have been applied to ϰ- and ι-carrageenans, gelled by KCl, either alone or in the presence of other gums. Quantitative values for basic mechanical and rheological parameters obtained by this approach agree with published qualitative observations. IFT

34

Gel texture in foods - its relationship to choice of gelling agent, formulae and processing conditions.
Rasmussen, J.
Dechema-Monographien **77**, 187-196 (1974) [2 ref. En, de, fr] [A/S Kobenhavns Pektinfabrik, Lille Skensved, Denmark]

The gel characteristics breaking strength, cohesiveness, rigidity and elasticity were defined from load deformation curves drawn by the Instron Universal Testing machine. Texture characteristics of various gels were investigated. Agar, gelatin, ϰ and iota carrageenan can produce very brittle to very cohesive and elastic gels. In water agar gives the highest breaking strength/unit of concn. but a synergistic effect of ϰ carrageenan with locust bean gum makes this combination competitive to agar in breaking strength. Agar, gelatin and iota carrageenan are more tolerant to salt than ϰ carrageenan. Products containing sugar in a concn >50% prevent use of carrageenan due to prejellification. With the exception of gelatin, the agents are all resistant to high temp. retorting at neutral pH, whereas none resist high temp. retorting at pH <4, but heat treatment at 85°C and pH 3.8 is possible for all the gelling agents. In milk gels at neutral pH, ϰ carrageenan gives the highest gel strength/unit concn. of gelling agent. No one gelling agent was entirely superior to the others, but each had specific properties suitable for some applications. RM

35

Some rheological properties of sodium carboxymethylcellulose solutions and gels.
Elliott, J. H.; Ganz, A. J.
Rheologica Acta **13** (4/5) 1178-1182 (1974) [16 ref. En] [Res. Center, Hercules Inc., Wilmington, Delaware 19899, USA]

Sodium carboxymethylcellulose (CMC) is a valuable and widely used component of food systems. The rheological properties of a series of CMC solutions and gels have been determined under both steady and imposed sinusoidal shear conditions, over a wide range of shear rates and frequencies, using the Weissenberg Rheogoniometer. Depending upon the CMC type, degree of substitution, and method of solution preparation, the rheological behaviour ranged from viscoelastic solutions to unctuous gels. If certain polyvalent cations, e.g. Al^{3+}, are present, rigid elastic gels may be formed. These results are interpreted in terms of fringe micelles, arising from crystalline residues in the CMC. Gels which show unctuous behaviour may be described in terms of a modified Bingham Body model. Where appropriate, the experimental results are quantitatively analysed in terms of the parameters of this model. The application of these findings to the use of CMC in food systems is discussed. AS

36

[Cassava starches. III. Some useful properties in varieties from Minas Gerais.]
Rosenthal, F. R. T.; Espindola, L.; Mello, A. P.; Correa, A. M. N.
Revista Brasileira de Tecnologia **5** (3/4) 173-184 (1974) [9 ref. Pt, en] [Lab. de Amido, Inst. Nacional de Tecnologia, Av. Venezuela, 82, Rio de Janeiro, GB, Brazil]

Starches from 11 var. or cultivars of cassava grown in Minas Gerais province (Brazil) were studied. Viscosities of starch pastes were determined using a Brabender Viscograph under different conditions of temp., stirring, enzyme action and pH. Solubilities, gel formation and resistance of gel films to fracture and elongation were also assessed. The results are tabulated or graphically presented and suitabilities of the different starches for various purposes are discussed on their basis. SKK

37

Flow properties of gums useful to the food industry.
Krumel, K. L.; Sarkar, N.
Food Technology **29** (4) 36, 38, 40-41, 43-44 (1975) [13 ref. En] [Designed Polymers Res. Lab., Dow Chem. Co., 1604 Building, Midland, Michigan 48640, USA]

This article discusses the rheological properties of hydrocolloid solutions, compares the thickening efficiency of several natural and synthetic hydrocolloids commercially available, and shows how they can be used in formulating food products. IFT

38

[NMR investigations on the efect of processing on water binding capacity of potato starch.]
Kernresonanzuntersuchungen zum Einfluss der technischen Aufarbeitung auf die Wasserbindungsfähigkeit von Kartoffelstärke.
Hennig, H. J.; Lechert, H.; Krische, B.
Stärke **27** (5) 151-154 (1975) [12 ref. De, en, fr] [Inst. für Physikalische Chem., Univ., D-2 Hamburg 13, Laufgraben 24, Federal Republic of Germany]

It was shown that the content of tightly bound water was not affected by conditions of drying and size of starch granules, but was related to the ionic strength of the water used during isolation of the starch. RM

39

A rapid turbidimetric method for the determination of the precipitation curves of carrageenans.
Matulewicz, M. C.; Cerezo, A. S.
Journal of the Science of Food and Agriculture **26** (3) 243-250 (1975) [8 ref. En] [Dept. de Quimica Organica, Fac. de Ciencias Exactas y Naturales, Pabellon 2, Ciudad Univ., Buenos Aires, Argentina]

A rapid turbidimetric method for determination of the precipitation curve of carrageenans is proposed. It is based on precipitation of a solution of carrageenan, under standard conditions, at a given concn. of KCl and measurement of the turbidity produced. The precipitation curves of 5 samples of carrageenans from Chondrus crispus, Gigartina skottsbergii and Iridea undulosa were determined. The results show that the method can be used to characterize the sample and (qualitatively) the distribution of the molecules; and so, to determine its commercial value. AS

40

The in vitro and in vivo effects of carrageenin on humoral and cellular factors of natural resistance.
Miler, I.; Stelzner, A.
Folia Microbiologica **20** (3) 251-260 (1975) [40 ref. En] [Res. Inst. for the Care of Mother & Child, 147 10 Prague 4, Czechoslovakia]

41

Evaluation of gelatin gel texture by penetration tests.
Kamel, B. S.; DeMan, J. M.
Lebensmittel-Wissenschaft + Technologie **8** (3) 123-127 (1975) [12 ref. En] [Dept. of Food Sci., Univ. of Guelph, Guelph, Ontario, Canada]

The effect of punch shape and dimension on measurement of shear and compression components of gelatin gels was investigated. 4 sets of punches were used which had the same perimeter and cross sectional area, but differed in surface area due to the different shapes of the punches. The penetration force for both can be expressed by the equation: $F/A = K_c + 4K_s(1/D + C/A)$ or $F/P = K_c(D/4)^s + K_s + C/P$; where K_s, K_c and C are constants, P is perimeter, A is area of the punch and D is the diam. K_s and K_c represent the shear and compression coeff., respectively. A linear relationship between both force/cross sectional area and 1/ diam. and force/perimeter and diam. of the punch was observed when using cylindrical punches with flat end, 30° cone end and hemispherical end, when using gles of different concn. No linear relationship between force/cross sectional area and 1/diam. of the punch and force/perimeter and diam. was obtained when using the punch with 45° cone end. It was concluded that the penetration force in gelating gels can be represented by components of both punch perimeter and punch area and may involve compression and shear factors. AS

42

[Preserved soup thickening agents containing acid protein hydrolysates.]
Laryushkina, E. Yu.; Kundin, P. V.; Volkov, E. N.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Konservnoi i Ovoshchesushil'noi Promyshlennosti 20, 42-45 (1974) [Ru]

Thick soups are manufactured from meat, fish or mushroom broth thickened by addition of groats, vegetables, meat, mushrooms etc. As the basis in all cases onions, carrots, parsnips, celery and sometimes tomato paste and wheat flour are used. This basis is commercially manufactured as a preserved convenience product containing the above ingredients with an addition of fat, salt, pepper and bay leaf. For the use of vegetarians the convenience products are manufactured with the addition of protein hydrolysates to replace meat or fish in the finished soup. Recipes for soup thickening agents with protein hydrolysates are given. The production process is the same as for normal soup thickenings. Content of proteins, fats and carbohydrates/100 g product is given, with its caloric value. A batch of soup thickening agents manufactured on a pilot scale was subjected to microbiological analysis and the products were stored long-term at -30°C and +30°C and RH 42-98%. Sensory evaluation was performed and the contents of total amino N, total and active acidity, acidity and peroxide values were determined. The highest score was obtained by the thickening agent containing tomatoes. The protein hydrolysates furnish an additional supply of proteins (5 g/100 g thickener) in addition to flavouring properties. The storage period in warehouses without controlled temp. was established as 30 months without flavour deterioration. [See also preceding abstr.] STI

43

[Method for improving rheological properties of tvaroh and cheese.]
Hylmar, B.; Teply, M.
Czechoslovak Patent 151 976 (1974) [Cs]

A feature of the process is that pre-gelatinized starch is added to cheese milk at 1-100 g/kg of the final product, or at a later manufacturing stage in order to improve rheological properties (consistency, water-binding capacity) of the resultant tvaroh or cheese. According to 1 example applicable to the manufacture of tharoh by a method involving centrifugal separation of the curd, 1% oxidized wheat starch in pre-gelatinized form is added to the milk which is then homogenized, pasteurized, cooled to 22°C, inoculated with 0.5% cream starter, and rennet is added at 1 ml/100 l. milk. The coagulum which is formed after 18 h is cut and the whey separated in a curd separator. FL

44

Alkaliviscogram and other properties of starch of tropical rice.
Suzuki, H.; Juliano, B. O.
Agricultural and Biological Chemistry 39 (4) 811-817 (1975) [19 ref. En] [Chem. Dept., Int. Rice Res. Inst., Los Banos, Phillippines]

In the alkaliviscogram of starch of 26 nonwaxy rices grown in the tropics, gelatinization normality correlated positively with final gelatinization temp. (BEPT) of starch (r = 0.969) and negatively with alkali spreading value of milled rice (r = 0.931). Peak viscosity was not linearly related to amylose content. Among samples of rice starch having a high amylose (>28%) content, peak viscosity was correlated with the gel consistency of starch (r = 0.690) and of milled rice (r = 0.644). These high-amylose starches showed the widest variation in peak viscosity. Amylose content and gel consistency were inherited from the same parent in all 9 varieties and lines studied, whereas peak viscosity, gelatinization normality and the final BEPT were inherited from either parent. The starch of 5 waxy rices showed higher peak viscosities (even at a concn. of 1.8%) than a 2% suspension of non-waxy rice starch. AS

45

[Determination of starch gelation temperature.]
Dukhanina, L. A.; Luk'yanov, A. B.
Sakharnaya Promyshlennost' 49 (2) 65-68 (1975) [5 ref. Ru] [MTIPP, USSR]

A new method is described for detn. of starch gelation temp. intervals, based on the fact that during the heating of a starch suspension, its vol. increases quickly at the beginning of gelation. The equipment consists of a cell 3 × 3 × 6 cm in size, an electrode of stainless steel (3 × 6 cm), a laboratory transformer, a thermometer and a microscope. During measurement, the cell is filled with 45% starch suspension in 1% NaCl. The heating rate is 3-5°C/min. Each detn. takes 15 min. The influence of starch concn., electrolyte, DM in the starch, swelling of starch grains in the electrolyte, thickness of the suspension layer, and heating rate is discussed. The results differ by ±0.5°C for 40-50% starch suspension and a heating rate of 3-5°C/min. The swelling of the starch grains between 3 and 20 min has no influence on results. To a small extent the results depend on NaCl concn., ranging from 1 to 5%. Results of detn. of the gelation interval of 2 starches by the new method are given. STI

46

Base composition for preparing food products.
Powell, L. A. (Wellman-Power Gas Inc.)
United States Patent 3 843 805 (1974) [En]

A dry mixture consisting of pregelatinized starch, calcium acetate and sodium caseinate is claimed to delay the microbiological deterioration of milk or cut meats. Further addition of fat, casein and starch to the dry mixture produces a mix that can be used to make stable whipped desserts on dispersing in water. JMD

47

Investigation into the ageing process of gel systems by the measurement of their dynamic moduli.
Nijenhuis, K. te
Dechema-Monographien 77, 177-186 (1974) [9 ref. En, de, fr] [Lab. of Physical Chem., Delft Univ. of Tech., Netherlands]

The ageing process of a 2% gelatin solution was compared with that of a model system i.e. a 10% polyvinylchloride (PVC) solution in di-(2-ethylhexyl phthalate. Storage and loss moduli were measured in a dynamic viscometer. Plots of storage moduli against ageing time or against angular frequencies for several ageing times, at various temp. revealed several similarities and differences between the 2 systems. Gelatin/water system was not affected by angular frequency, suggesting that the applied frequency range was completely within the rubbery region of the gelatin gel, while a rubber plateau was reached gradually in PVC, with onset of rubber-glass transition at high frequencies. The methods successfully applied to the PVc system will probably need some adaptation to provide information on the ageing process in gelation and other gel formers and thickeners. RM

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FAB 42

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H. BROOKES
ASSISTANT EDITOR

1

Frozen gelatin dessert.
Clausi, A. S.; Glicksman, M.; Farkas, E. (General Foods Corp.)
United States Patent 3 889 002 (1975) [En]

A method is described for producing a thick, stirrable gelatin-based suspension, which can readily be cleaved with a spoon, for use as a gelatin dessert concentrate. It is readily dispersible and soluble in hot tap water and quick-setting on subsequent refrigeration, so producing a convenient-to-serve gelatin dessert. IFT

2

Viscometric measurements and pectic content of frozen concentrated orange juices for citrus futures.
Rouse, A. H.; Albrigo, L. G.; Huggart, R. L.; Moore, E. L.
Citrus Industry **56** (7) 18, 20, 22 (1975) [14 ref. En]

3 types of viscometers (tube, Brabender Visco-Corder and Brookfield) were investigated for their practicability in measuring consistency of high density orange juices between 57 and 65°Brix levels. Correlation coeff. among viscometers were all greater than 0.94. Correlation between the Brookfield models HAT and LVT was 0.96. Most of the juice constituents, especially °Brix, total pectin and water-insoluble solids., showed a high simple correlation to apparent viscosity ($r = 0.45$ to 0.93). Multiple regression equations predicting viscosity for the various viscometers had coeff. of determination (R^2) ranging from 0.81 for Brookfield HAT to 0.90 for the Brabender (200 rev/min). The 2 variables found most satisfactory in the multiple regression equations for predicting viscosities were °Brix and total pectin. Average values for the % of total pectin soluble in water, ammonium oxalate and sodium hydroxide, representative of 85 commercial samples, were 46.3, 11.6 and 42.1%, respectively. Water-insoluble solids ranged from 537 to 1011 mg/100 g of concentrate, with an average of 731 mg. AS

3

Effect of some nonstarch components in corn and barley starch granules on the viscosity of heated starch-water suspensions.
Goering, K. J.; Jackson, L. L.; DeHaas, B. W.
Cereal Chemistry **52** (4) 493-500 (1975) [13 ref. En] [Dep. of Chem., Montana State Univ., Bozeman, Montana, USA]

Barley and corn starch granules exhaustively extracted with 85% methanol show negligible pasting peaks, greater cooking stability, and lower setbacks. Addition of alcohol-free extract to extracted starches essentially reproduces the curve obtained from the unextracted starch. The addition of pure, unsaturated fatty acids at the concn. found in the original starch essentially reproduces original curve. An examination of the various fatty acids present in the lipid fraction indicated that linolenic acid was most effective in modifying the viscosity curve. It is suggested that the pasting peak is not due to gelatinization and breakdown of granules, but is due to the breakdown of an amylose-fatty acid complex. AS

4

[The testing of gelatin in food laboratories.] Die Prüfung von Speisegelatine im Lebensmittel-Laboratorium.
Schrieber, R.; Stahl, H.
Deutsche Milchwirtschaft **26** (26, Beil. Lebensmittel-Labor) II-VI (1975) [11 ref. De] [Deutsche Gelatine-Fabriken Stoess & Co. GmbH, Eberbach/Baden, Federal Republic of Germany]

Uses of gelatin in many foods, including fruit yoghurt, soured milk beverages, fresh cheese products, foamed desserts, low-fat spreads, bakery products, sweets, tinned ham, aspic and fruit juices are discussed. The article gives a detailed description of the testing of gelatin, covering purity regulations, dissolution, chemical tests (moisture content, pH, SO_2, heavy metals and H_2O_2), bacteriological tests (total count of aerobic bacteria, coliforms, spore-formers, and for inhibitory substances), and quality indices (gel firmness, finger test, solidification point, viscosity, colour, clarity and iso-electric point). FL

5

[Centrifugal thickening of starch suspensions.]
Pevzner, G. M.; Metal'nikov, V. A.
Sakharnaya Promyshlennost' **49** (3) 57-58 (1975) [Ru] [VNIIK, USSR]

At present continuously operated centrifuges with worm discharge are used for thickening starch suspensions. A new type of centrifuge is described. Four series of experiments were carried out to determine the effect of basic parameters on thickening of potato starch suspensions. Using mathematical and statistical methods a relation was derived which permits prediction of DM content in starch after centrifugal processing of the potato starch suspension. STI

6

[Use of novel gel-forming starch hydrolysis products in the food industry.]
Richter, M.; Schierbaum, F.; Augustus, S.
Elelmezesi Ipar **29** (5) 139-143 (1975) [Hu, ru, en, de] [Zentralinst. für Ernährung der Akad. der Wissenschaften der DDR, Potsdam-Rehbrücke, German Democratic Republic]

Production methods and properties of novel gel-forming starch hydrolysis products (SHP) produced from potato starch, and possibilities of using these products as fat substitutes in low-calorie foods (e.g. soups, gravies, confectionery creams, fruit drinks, etc.) are described in detail. Calorie contents of various formulations and their (cheaper) production methods are tabulated. IF

7

Syrup and method of manufacturing same.
Carlson, P. O. (General Foods Corp.)
United States Patent 3 897 262 (1975) [En]

Table syrups containing semi-refined sugar are thickened with carboxymethyl cellulose. IFT

8

Milk-gel structure. IV. Microstructure of yoghurts in relation to the presence of thickening agents.
Kalab, M.; Emmons, D. B.; Sargant, A. G.
Journal of Dairy Research **42** (3) 453-458 (1975) [12 ref. En] [Food Res. Inst., Res. Branch, Agric. Canada, Ottawa, Canada]

Effects of 3 different thickening agents on the microstructure of yoghurt were examined by scanning and transmission electron microscopy. Unsupplemented yoghurt consisted of casein micelles fused together and linked in long chains; they seldom appeared in clusters. Addition of 0.5% gelatin caused no observable change in the yoghurt structure. Carrageenan (0.4%) formed a markedly fibrillar microstructure, which connected large clusters of casein micelles. The fibres were thin and long and no free terminations were observed. Pregelatinized waxy maize starch (2%) appeared under scanning electron microscopy in the form of short fibres and sheets. The fibres frequently had free terminations and only some of them were connected with small clusters of casein micelles. Transmission-electron microscopy did not distinguish between pregelatinized starch and carrageenan additive. [See FSTA (1975) **7** 9P2018 for part III.] AS

9

[Gelling and thickening agents in the food industry.] Gelierungs- und Verdickungsmittel in der Lebensmittelindustrie.
Christensen, O.
Industrielle Obst- und Gemüseverwertung **60** (9) 229-232 (1975) [De] [Hercules Food Ingredients Group, Lille Skensred, Denmark]

This review-type article deals with properties, preparation, characteristics and uses of pectin, gelatin, carrageenan, alginates and agar. SKK

10

[Interaction of Na^+, K^+ and Ba^{++} ions on the gel-forming properties of carrageenan.]
Stavrov, S. N.; Nikolov, I. P.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 1, 35-37 (1975) [7 ref. Ru] [Kishinevskii Ordena Trudovogo Krasnogo Znameni Gosudarstvennyi Univ. im. V.I. Lenina, USSR]

The effect on gel-forming properties, of gradual replacement of the bivalent cations of carrageenan by monovalent cations, while retaining the degree of polymerization of the carrageenan molecules and the number of endogenous ionogenic groups was investigated. The variables were the max. shear stress of gels of Ba-carrageenan at different concn. and at different levels of Ba^{2+} ion replacement by Na^+ and K^+ ions. The max. shear stress passed through the point of maximum. On fractionation of the carrageenan dissolving in water, the endogenous K (in contrast to the Na and K) congregated into a fraction which was not readily soluble. STI

11

Commercial pectin: a review.
Francis, B. J.; Bell, J.-M. K.
Tropical Science **17** (1) 25-44 (1975) [47 ref. En] [Tropical Products Inst., 56/62 Gray's Inn Road, London WC1X 8LU, UK]

The technological problems of commercial pectin production are discussed in relation to its natural distribution, function and physico-chemical properties. Constraints upon the production and marketing of pectin products in developing countries are identified. Established sources of pectin (citrus waste and apple pomace) and potential sources of pectin (citrus, non-citrus fruit, cocoa pods, coffee berries, sunflowers, etc) are considered. Analytical control, commercial grading and standards, and packaging practices for pectin products are also outlined. A table of European imports (t/annum) is given for 1968-1972. GL

12

Physiological effects of carrageenan. In "Physiological effects of food carbohydrates" [see FSTA (1976) **8** 3L230]. [Lecture]
Stancioff, D. J.; Renn, D. W.
pp. 282-295 (1975) [68 ref. En] [Marine Colloids Inc., Rockland, Maine 04841, USA]

The source, properties and uses of carrageenan are first considered. Breakdown, absorption and toxicity of food grade and degraded carrageenan are reviewed. [See **8** 3L230 & 231.] VJG

13

[The use of pectin in the manufacture of foamed confectionery.] Die Anwendung des Pektins bei der Herstellung von aufgeschäumten Süsswaren.
Anon.
International Review for Sugar and Confectionery **28** (12) 456-460 (1975) [De]

Aspects considered in this paper include: solubility of pectins; factors influencing gelation of pectins (pH, temp., DM concn., other ingredients); the pectin concn. required in foamed confectionery; use of whipping agents in pectin-based confectionery; production control; practical aspects; and advantages of pectin as a gelling agent. Recipes are given for 2 types of fruit-flavoured pectin-based foamed confectionery. AJDW

14

Evaluation of certain food additives. Some food colours, thickening agents, smoke condensates, and certain other substances. Nineteenth report of the Joint FAO/WHO Expert Committee on Food Additives.
World Health Organization; Food & Agriculture Organization
World Health Organization Technical Report Series No. 576, 23pp. ISBN 92-4-120576-8 (1975) [En] [Geneva, Switzerland]

Among general matters considered in the report are the detn. of impurities in food additives and investigation of their toxicity. The preservation and flavouring of food by smoking procedures is discussed. More detailed information is required on the raw materials, smoking process, composition of the smokes (including purified smoke condensates and liquid smoke) and the end products. A number of food colours, thickening agents and other miscellaneous food additives were evaluated for the first time and some substances re-evaluated. Annexes included are: reports and other documents resulting from previous meetings of this committee; acceptable daily intakes and information on specifications; and further toxicological studies and information required. Fr, Ru and Es editions of the report are in preparation. [This report is also issued as FAO Nutrition Meetings Report Series No. 55.] AL

15

[Processing and stability studies with coconut milk.]
Martin, Z. J. de; Uboldi-Eiroa, M. N.; Kato, K.; Silva, S. D. da; Leitao, M. F. F.; Angelucci, E.; Medina, J. C.
Coletanea do Instituto de Tecnologia de Alimentos **6** (1) 51-68 (1975) [17 ref. Pt, en]

A process described in detail (with the aid of a flow diagram) for producing coconut milk basically consists of the following stages: selection of nuts; washing in chlorinated water; manual cracking; removal of coconut water, shell and brown skin; grinding the pulp; extraction of coconut milk in a hydraulic press; heating the milk at 90°C for a few min; addition of emulsifiers and thickeners; homogenization at 300 kg/cm^2; filling into 280-ml bottles; and sterilization at 115°C for 45 min. Coconut milk produced in this way and containing 0.3% Tween 80 as emulsifier and 0.4% carboxymethyl cellulose (CMC) as thickener was stored for 6 months at room temp. Samples were withdrawn at intervals and examined. Apart from a fall in viscosity between 30 and 90 days of storage (from 636.7 to 393.3 cP) the product remained physically, chemically and microbiologically stable during storage. Tween 80 was an efficient emulsifier and CMC an efficient thickener, preventing separation of phases. RM

16

Viscometric measurements and pectic content of frozen concentrated orange juices for citrus futures.
Rouse, A. H.; Albrigo, L. G.; Huggart, R. L.; Moore, E. L.
Proceedings of the Florida State Horticultural Society 87, 293-296 (1974) [14 ref. En] [IFAS Agric. Res. and Education Cent., Lake Alfred, Florida, USA]

3 types of viscometer (tube, Brabender Visco-Corder and Brookfield) were investigated for their practicability in measuring consistency of 85 samples of high density orange juices between 57° and 65° Brix. Correlation coeff. among viscometers were all >0.94. Correlation between the Brookfield Models HAT and LVT was 0.96. Most of the juice constituents, especially °Brix, total pectin and water-insoluble solids, showed a high simple correlation to apparent viscosity ($r = 0.45$-0.93). Multiple regression equations predicting viscosity for the various viscometers had coeff. of determination (R^2) ranging from 0.81 for the Brookfield HAT to 0.90 for Brabender (200 rev/min). The 2 variables found most satisfactory in the multiple regression equations for predicting viscosities were °Brix and total pectin. Average values for the percentage of total pectin soluble in water, ammonium oxalate and NaOH, representative of 85 commercial samples, were 46.3, 11.6 and 42.1%, respectively. Water-insoluble solids ranged from 537 to 1011 mg/100 g of concentrate with an average of 731 mg. AS

17

[The application of starch in the food industry.]
Die Anwendung der Stärke in der Lebensmittelindustrie. [Book]
Zobel, M.
165pp. (1975) [36pp. of ref. De] Hamburg, Federal Republic of Germany; Verlag Paul Parey
Price DM48

This detailed book, number V-5 in the series 'Starch Handbook in Individual Monographs' includes the following chapters: Introduction (pp. 9-39, covering the various types of starches, starch derivatives and modified starches used in the food industry); Foods of plant origin (pp. 39-85); Foods of animal origin (pp. 86-96); Edible fats (pp. 97-97); Sauces (pp. 97-101); Prepared meals and snacks (pp. 102-103); Dietetic foods (pp. 103-113); Food coatings (pp. 113-116); Spices and seasonings (pp. 116-121); Colorants (pp. 121-122); Alcoholic drinks, coffee, cocoa products and tobacco (p. 122); Starch as a vitamin stabilizer (pp. 122-123); and Other uses (p. 123). A 36-page bibliography and a 6-page subject index are included. AJDW

18

Sodium caseinate - carrageenan reaction.
Towler, C.
New Zealand Journal of Dairy Science and Technology **10** (4) 168-169 (1975) [En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

The viscosity of 1% carrageenan, but not 2.5% sodium caseinate, increased after freezing at -15°C for 2 h and thawing for 2.5 h at 18°C. A larger increase occurred when a mixed carrageenan/caseinate solution was frozen and thawed, but the viscosity decreased again in the next 24 h to approx. that of a mixture of separate solutions of caseinate and carrageenan that had each been frozen and thawed. Interaction of carrageenan and caseinate, as assessed by the increase in viscosity after freezing and thawing, decreased linearly as the pH of caseinate increased from 6.2 to 6.95. JMD

19

[Sulphate and viscosity of carrageenan.]
Ito, Y.; Iwaida, M.
Journal of the Food Hygienic Society of Japan [Shokuhin Eiseigaku Zasshi] **16** (2) 116-118 (1975) [9 ref. Ja, en] [Nat. Inst. of Hygienic Sci., Osaka Branch, Hoenzaka No. 6, Higashi-ku, Osaka, Japan]

Sulphate contents of commercial carrageenan were found to be 20-40% as SO_4 by the barium sulphate gravimetric method. Viscosities were measured for 1.5% carrageenan solution at 75°C by using either BN type rotation viscometer or Ubbelohde viscometer and were found to be >5 cP. TM

20

[Application of pectin in the food industry.] Die Verwendung von Pektin in der Lebensmittelindustrie. [Lecture]
Lohmann, R.
Gordian **75** (7/8) 231-234 (1975) [De, en]

Properties and food uses of pectin are described with special attention to high- and low-esterified pectin. Uses for increasing viscosity, and as water-binding, emulsifying, thickening, stabilizing and gelling agent for confectionery, fruit, desserts, ketchups and salad creams are set out in a table. RM

21

[Diffusion of water and soluble solids during protein fibre coagulation.]
Castaigne, F.; Riel, R. R.; Boulet, M.
Canadian Institute of Food Science and Technology Journal **8** (3) 133-136 (1975) [3 ref. Fr, en] [Dep. des Vivres, Fac. des Sci. de l'Agric. & de l'Alimentation, Univ. Laval, Quebec, Canada]

Since industrially prepared spun protein fibres are small (0.05-0.10 mm), for easier observation a spinneret comprising a tube one-eight of an inch in diam., extruding a fibre 0.5 cm in diam. was used. Coagulation was induced by extrusion into a solution of $CaCl_2$ (8.6%) in HCl, initial pH 1.86. The protein solution contained 10% soya protein ('Promine F'), 3% sodium alginate (Kelgine LV) and 87% water. The ratio of coagulant wt. to protein solution wt. was 10:1. Soluble solids concn. in the bath was monitored by refractometry, and wt. loss by the fibres assessed by draining, wiping dry and weighing after various times of coagulation. Protein leaching into the bath was considered negligible. The ratio of wt. of water lost in coagulation of the fibre to wt. of soluble solids gained was almost constant with time, with a value of 3.58 (SD 0.17). Coagulant batch pH rose from 1.86 to 2.62 in 15 min. Rate of coagulation front movement was observed by photographing sectioned fibres at different times after extrusion, and is recorded graphically. [See also preceding abstr.] JRR

22

[Method for production of a dried thickener for soups and gravies.]
Sochor, V.; Ourednikova, E.
Czechoslovak Patent 163 524 (1975) [Cs]

Starchy material containing proteins is gelatinized on a rolled drier, milled and screened, followed by roasting at 120-140°C for 30-150 min, with continuous agitation. The material is prepared by mixing 65 parts of wheat starch, 35 parts soybean flour and 200-400 parts water. STI

23

New starches; a key to new products and lower costs for the confectioner.
Smith, P. S.
Manufacturing Confectioner **55** (6) 55-59 (1975) [En] [Nat. Starch & Chem. Corp., 750 Third Avenue, New York 10017, USA]

The uses of modified food starches and dextrins are described, and typical formulations given for applications such as replacement of gum arabic, gelatin, sugar or coconut, or development of novel products. JRR

24

[Investigations on microorganisms in thickening agents. II. Cell counts of anaerobic spore-formers.] Untersuchungen über Mikroorganismen in Verdickungsmitteln. II. Keimzahlen anaerober Sporenbildner.
Souw, P.; Rehm, H. J.
Chemie Mikrobiologie Technologie der Lebensmittel **4** (3) 71-74 (1975) [13 ref. De, en, fr] [Inst. für Mikrobiol., Univ. of Münster, Titusstrasse 7-15, D-4400 Münster, Federal Republic of Germany]

A simplified method for isolation of anaerobic spore-formers (petri dish sealed in container with Na_2CO_3 and pyrogallol) was developed and

applied to a number of food thickening agents. Very low counts were obtained for total anaerobic sporeformers (max. 170/g). Clostridium perfringens was detected in 1 of 16 samples of gum tragacanth (30/g), 2 of 12 samples of gum arabic (10 and 2/g) and 3 of 12 samples of carob flour (7, 3 and 43/g), and was absent from gum karaya and guar flour. Alginate and carrageen contained no spore-forming anaerobes. Possible risks of food poisoning are discussed, especially by vacuum-packed products with high water activity. [See FSTA (1974) 6 3T158 for part I.]   RM

25

[Study of polymer dispersion in agar and agaroid by means of molecular weight distribution.]
Chernenko, L. E.; Gilinskaya, E. P.; Putilova, I. N.; Gorin, L. F.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 3, 26-28 (1975) [4 ref. Ru] [Moskovskii Ordena Trudovogo Krasnogo Znameni Tekh. Inst. Pishchevoi Promyshlennosti, USSR]

Differences between properties of agar and agaroid [carrageenan] are due especially to different contents of low- and high-mol. wt. units, i.e. different polymer dispersion. A constant (K) was found for characterizing the polymer-homologue chain and the solvent, and the degree of compactness which makes possible the calculation of mean mol. for all agar materials. A knowledge of the mol. wt. distribution in agar and agaroid serves, in practice and in theory, as an important aid in controlling the product properties.   STI

26

Propylene oxide.
United States of America, Environmental Protection Agency
Federal Register 41 (6, Jan. 9) 1589 (1976) [En] [Washington, DC, USA]

Edible gums may be fumigated with propylene oxide, under the Federal Food, Drug, and Cosmetic Act, for $\leq$24 h at $\leq$125°F.   CAS

27

[Study of agar and agaroid and their products by infrared spectroscopy.]
Chernenko, L. E.; Gilinskaya, E. P.; Putilova, I. N.; Romantseva, L. N.; Smirnova, I. N.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 5, 26-30 (1975) [8 ref. Ru] [Moskovskii Ordena Trudovogo Krasnogo Znameni Tekh. Inst. Pishchevoi Promyshlennosti, USSR]

IR spectra of agar and agaroid (carrageenan) are generally very similar; IR spectra of hydrolysis and γ-radiolysis products of the 2 polysaccharides are, however, considerably different. The nature and causes of these differences are discussed.   STI

28

Toxicological evaluation of some food colours, thickening agents, and certain other substances. Nineteenth report of the Joint FAO/WHO Expert Committee on Food Additives.
World Health Organization, Joint FAO/WHO Expert Committee on Food Additives; Food & Agriculture Organization, Joint FAO/WHO Expert Committee on Food Additives
WHO Food Additives Series No. 8, 89pp. (1975) [many ref. En] [Geneva, Switzerland]

This monograph gives an account of all biochemical and toxicological data made available to the FAO/WHO Expert Committee on Food Additives, which met in April 1975, for the following substances, together with references for each substance, and an estimate of acceptable daily intake (given in parentheses, mg/kg body wt.). Food colours - amaranth (0-0.75), ferrous gluconate (no upper limit specified), quinoline yellow (0-0.5); thickening agents - carob bean gum, guar gum, tara gum, microcrystalline cellulose (all not specified), pectin (amidated) (0-25); miscellaneous food additives - dichlorofluoromethane (0-1.5), tertiary butyl hydroquinone (0-0.75), triacetin (not specified). This monograph is also issued as FAO Nutrition Meetings Report Series No. 55A. [See also FSTA (1976) 8 4T171.]   AL

29

[The effect of heavy metal ions on gel forming properties of agaroids.]
Stavrov, S. N.; Babin, B. N.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 2, 55-58 (1975) [7 ref. Ru] [Kishinevskii Ordena Trudovogo Krasnogo Znameni Gosudarstvennyi Univ. im. V. I. Lenina, USSR]

Samples of agaroids containing ions of Mn, Pb, Ni, Co, Zn, Cu, Al or Fe are hydrolysed in water according to the type of salts (weak bases and strong acids); they may be arranged in declining order according to the pH value of the 4% solutions. During boiling the agaroid hydrolysis is accompanied by hydrolysis of ester-bound sulphate groups and by the fragmentation of molecules. The Cu-, Zn-, Al- and Fe-agaroids do not form gels. The gels of the remaining ions may be arranged according to their firmness as follows: Mn-, Pb-, Ni-, Co-agaroid. At concn. >4% the firmness of the Pb-agaroid gel drops below that of Co-agaroid. Weak base salts and strong acid salts reduce the firmness of the gels formed due to pH reduction.   STI

30

Studies on rheological properties of foodstuffs. IV. The viscosities of methylcellulose-citric acid-water system.
Yamamoto, D.; Iso, N.
Bulletin of the Faculty of Agriculture Meiji University [Meiji Daigaku Nogakubu Kenkyu Hokoku] No. 26, 15-19 (1971) [6 ref. En, ja]

The viscometric behaviour of conc. (1.0-1.5%) aqueous solutions of methyl cellulose (MC) was

markedly non-Newtonian, and was greatly affected by the addition of citric acid. At an MC concn. of 1.5%, flow was thixotropic, with apparent viscosities decreasing with increasing citric acid concn. (0-1.2%) and temp., 30-50°C. There was no marked hysteresis. Conversely a 1.0% solution of MC was dilatant, for citric acid concn. in the above range. With acid concn. >1.0%, hysteresis was observable, fluidities decreasing with increasing shear rate, and continuing to decrease on reduction of the rate of shear. The behaviour is attributed to citric acid disturbance of water-MC hydrogen bonding and formation of a microgel. [See FSTA (1971) 3 8T397.] JRR

31

The use of pectin in the manufacture of aerated confectioneries.

Anon.

CCB Review for Chocolate, Confectionery and Bakery Unnumbered introductory issue [1957/1976], 23-25 (Undated) [En]

The use of high methoxyl pectin (DM 55-75%) as a gelling agent for aerated confectionery products containing ≤80% soluble solids at pH 3-4 is discussed. Aspects covered are effect of temp. on pectin gelation speed at fixed conditions of pH and soluble solids content, addition of pectin, the effect of pectin concn. (0.5-2.5%) on rigidity and breaking strength, and addition of whipping agents and other ingredients. It is essential to avoid pre-gelation of aerated products before depositing and breakage of the gelled structure when formed; gelation time can be delayed as required by higher pH (lower acid addition), reduced soluble solids, and higher temp. (>50°C). A good combination is pH 3.4, 75% soluble solids, depositing temp. 80°C and time 15 min. AL

32

Starch hydrolyzed products.

German Democratic Republic, Akademie der Wissenschaft

British Patent 1 423 780 (1976) [En]

Starch hydrolysis products with a dextrose equivalent <25% are used as additives for foods. 15-50 wt. % starch is suspended in water, mixed at optimum pH with a starch hydrolysing enzyme, heated to swell the starch granules, hydrolysed for 5-30 min, heated to inactivate the enzyme and either converted by cooling into a gel or dried. GL

33

Starch containing concentrates.

Cheng, H.; Moore, C. O. (A. E. Staley Manufacturing Co.)

United States Patent 3 949 104 (1976) [En]

Additives are used to reduce the thickening capacity inhibition of intermediate starch containing products. The intermediate product may be a concentrate containing cold water swelling starch granules suspended in an aqueous media adapted to maintain the starch granules in an unswollen form. GL

34

Viscometric characterization of cassava starch pastes.

Odigboh, E. U.

Dissertation Abstracts International, B 35 (11) 5394-5395: Order No. 75-9820 (1975) [En] [Pennsylvania State Univ., University Park, Pennsylvania, USA]

The effects of drying temp., cooking temp. and paste temp. at different paste concn. on the viscometric characteristics of cassava starch were studied, using MacMichael and Stormer viscometers. For measurements with the MacMichael viscometer, a factorial experiment was used in which, for each of 3 drying temp., paste viscosity was measured at 4 concn., 4 cooking temp. and 4 paste temp. Measurements using the Stormer viscometer were designed to follow the viscosity profile of the starch pastes through a cooking-cooling schedule. Results indicated that cassava starch pastes exhibit a plastic fluid flow behaviour. Stable pastes were formed at about 60-65°C during cooking. The temp. at which peak viscosity occurred decreased with increasing concn., e.g. 90°C for 2% paste, 73°C for 8% paste. The higher the drying temp., the lower the paste viscosity. Starch paste stability was significantly affected by drying temp. and concn. Application of shear during cooking reduced the extent of paste retrogradation on cooling. JA

35

[Thickener.]

Kikkoman Shoyu Co. Ltd.

Japanese Patent 5 100 186 (1976) [Ja]

Foods may be rendered highly viscous by the addition of a polysaccharide obtained by cultivating a microorganism of the genus Aerobacter. IFT

36

Pudding gelling agent.

Lauck, R. M. (Stauffer Chemical Co.)

United States Patent 3 934 049 (1976) [En]

Gelling agent mixtures for use in preparing cold set puddings comprises an alkali metal pyrophosphate, an alkaline metal orthophosphate, sodium or potassium carbonate and a thickening agent or pregelatinized starch or gum or mixtures thereof. IFT

37

Process for the preparation of "superior quality of agar from Indian red seaweed" (Gelidiella acerosa from Deoki).

India, Council of Scientific and Industrial Research

Indian Patent 138 358 (1976) [En]

The seaweed is shredded, soaked and wet-ground to a pulp, and then extracted at 10 lb/in^2 for 2 h in an autoclave after adjusting the pH to 5.8-6.0 with 1 N H_2SO_4. The hot extract is filtered using diatomaceous earth in a pressure filter. The agar gel is then freeze-thawed, and the crude agar is purified by redissolving in distilled water and repeated freeze-thawing. W&Co

38

[Carrageenan. Properties and food applications.] [Review]
Sanz Perez, B.; Tormo Iguacel, J.; Cunha Rudge, A.
Alimentaria No. 71, 83-88, 90 (1976) [60 ref. Es] [Dep. de Higiene y Tecnologia de los Alimentos, Univ. Complutense, Madrid, Spain]

39

Flavor enhancers.
Glicksman, M. (General Foods Corp.)
United States Patent 3 949 103 (1976) [En]

Flavour enhancing gel compositions are based upon mixtures of flavourings, alkyl cellulose compounds and polyhydric alcohols, which are heated until homogeneous mixtures are obtained and cooled to form a water-soluble gel. IFT

40

Dynamics of freezing and their effects on the water-holding capacity of a gelatinized starch gel.
Chan, W. S.; Toledo, R. T.
Journal of Food Science 41 (2) 301-303 (1976) [12 ref. En] [Dep. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

Starch gels undergo retrogradation when cooled to freezing temp. The extent of starch retrogradation as measured by the water-holding capacity (WHC) was found to be primarily dependent upon the time of residence in the region in the freezing temp. curve where water to ice transformation occurred, and the freezing process used. Very little change in the WHC occurred while precooling the material to the fp, and reducing product temp. below the freezing temp. resulted in a very small change in the WHC from that at the end of the phase change. An inverse relationship was observed the WHC of the frozen starch gel and the extent of reconstitution, as measured by the WHC and viscosity of the product reconstituted after freezing, pressing and dehydration. A readily reconstituted dried starch gel with a low bulk density was obtained when the WHC of the wet material prior to drying was at a min. IFT

41

[Structure and utilization of starch.] [Review]
Kainuma, K.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 49 (12) R61-R67 (1975) [43 ref. Ja] [Nat. Food Res. Inst., 1 Shiohama 4-12, Kotoku, Tokyo, Japan]

42

Specifications for identity and purity of some food additives including food colours, flavour enhancers, thickening agents and others.
Food & Agriculture Organization; World Health Organization
FAO Nutrition Meetings Report Series No. 54B, v + 216pp. (1975) [En] Rome, Italy

Specifications and identity tests given in this publication were prepared at the 18th session of the Joint FAO/WHO Expert Committee on Food Additives and should be considered in conjunction with the report of that meeting [see FSTA (1975) **7** 11T558]. Specifications are given for (i) food colours: annatto extracts, azorubine, beet red, β-apo-8'-carotenal, β-apo-8'-carotenoic acid methyl or ethyl ester, β-carotene (synthetic), Brilliant Black PN, canthaxanthin, caramel colour (NH_3 process), chlorophyll copper complex, chlorophyllin copper complex (Na or K salt), erythrosine, Food Green S, indigotine, iron oxides (and hydrated iron oxides), Patent Blue V, Ponceau 4R, Quinoline yellow, and turmetic; (ii) flavour enhancers: calcium d-L-glutamate, calcium 5'-guanylate calcium 5'-inosinate, calcium 5'-ribonucleotides, disodium 5'-guanylate, disodium 5'-inosinate, disodium 5'-ribonucleotides, L-(+)-glutamic acid, monoammonium L-glutamate, and monopotassium L-glutamate; (iii) thickening agents: enzyme-treated starches, carrageenan, pectin, tara gum and xanthan gum; and (iv) miscellaneous food additives: including aluminium potassium sulphate, aluminium sulphate, butyl p-hydroxybenazoate, calcium aluminium silicate, calcium gluconate, calcium lactate, calcium saccharin, dioctyl sodium sulphosuccinate, potassium chloride, potassium lactate, saccharin, sodium acetate, sodium lactate, and sodium saccharin. This document is also published as World Health Organization Food Additive Series No. 7. AL

43

[Some special starch derivatives.]
Chaves, O. G.; Buckle, T. S. de
Revista del Instituto de Investigaciones Technologicas 17 (96) 9-29 (1975) [10 ref. Es]

Properties and uses of modified starches are reviewed. Some characteristic properties and max. permitted levels in foods of maize and cassava starch and starch derivatives are tabulated, including pasting temp., final viscosity at 50°C, heat-cold- and acid-stability, gel formation, clearness of paste, and visco-elasticity. Applications and economic aspects are discussed. Viscograms of 25 modified maize starches and 15 modified cassava starches are shown. RM

44

[Electrical resistance of syrup during thickening up to crystal inoculation.]
Tuzhilkin, V. I.; Bochko, L. M.
Sakharnaya Promyshlennost' No. 1, 44-47 (1976) [2 ref. Ru] [MTIPP, USSR]

Automatically controlled boiling is carried out in 2 stages; a study was made of the electrical resistance of the syrup during thickening up to crystal inoculation, and of the changes of electrical resistance and of the basic technological indices during crystal growth. The functional relationships between supersaturation coeff., resistance and temp. were investigated, and a nomogram is presented which makes possible the detn. of supersaturation coeff. if resistance and temp. are known. Supersaturation coeff., determined on the basis of the nomogram, approaches that obtained experimentally; mean deviation is ±0.03.   STI

45

The properties and uses of natural and modified starches. [Review]
Marrs, W. M.
Scientific and Technical Surveys, British Food Manufacturing Industries Research Association No. 85, 21pp. (1975) [97 ref. En, fr, de] Price £3 [British Food Manufacturing Ind. Res. Ass., Randalls Rd., Leatherhead, Surrey, UK]

This survey describes recent developments in the uses of starches, both native and modified, in foods and collects information which helps in the development of starch as an alternative raw material in foods. Methods of chemical modification (acid hydrolysis, oxidation, crosslinking and substitution by esterification and etherification) are considered together with the legal aspect of chemical modification in the US and in some European countries (France, Netherlands, Italy, Denmark, Federal Republic of Germany, and Belgium).   VJG

46

[The rheology of starch.] Die Rheologie auf dem Stärkegebiet. [Book]
Schutz, R. A.
121pp. ISBN 3-489-75614-2 (1974) [many ref. De] Hamburg, Federal Republic of Germany; Verlag Paul Parey Price DM64

This book, number IX-1 in the series 'Starch handbook in individual monographs' produced under the general editorship of M. Ulmann, contains the following chapters: Basic principles of rheology (pp. 12-32); Rheometry (pp. 33-61); The rheology of very dilute solutions - physical-chemical characterization of starch (pp. 62-72); Paste production and gelatinization curves (pp. 73-85); Rheological behaviour of pastes (pp. 86-100); and The viscoelastic behaviour of starch paste (pp. 101-110). A bibliography and author and subject indexes are included. [See also preceding abstr.]   JA

47

[Microbiology and microbial changes in thickening agents.] Mikrobiologie und mikrobielle Veränderungen von Verdickungsmitteln.
Souw, P.
Mitteilungsblatt der GDCh-Fachgruppe Lebensmittelchemie und Gerichtliche Chemie **30** (7) 121-126 (1976) [6 ref. De] [Inst. für Mikrobiol., Univ. Münster, Federal Republic of Germany]

Studies on the microflora and microbial decomposition of various thickeners (gum tragacanth, gum arabic, gum kharaya, guar gum, locust bean flour, alginates, carrageenan) are discussed. Aerobic bacteria predominated (enterococci and Staphylococcus aureus being present in large numbers); counts of yeasts and moulds were also high. Counts of anaerobic spp. were low. A few samples contained Clostridium perfringens; none contained Escherichia coli. Studies on survival of bacteria in dry thickening agents showed E. coli, Staph. aureus and enterococci to be capable of survival for a limited time; of these, survival of Staph. aureus was poorest. Survival of bacteria in dry gum kharaya was poor, as a result of the presence of inhibitory polyflavanols. Decomposition of the thickening agents by Bacillus coagulans, B. lentus, B. cereus, B. licheniformis and B. firmus was studied; a table of results is given.   AJDW

48

Dry food mixes.
Unilever Ltd.
British Patent 1 429 638 (1976) [En]

Dry food mixes for soups, sauces, gravies or desserts comprise a powdered natural vegetable gum thickener coated with an edible fatty hydrophobic substance admixed with other dry food solids.   IFT

49

Method of producing starch hydrolysis products for use as a food additive.
Richter, M.; Schierbaum, F.; Augustat, S. (**German Democratic Republic**, Akademie der Wissenschaften der DDR)
United States Patent 3 962 465 (1976) [En]

A starch hydrolysis product with a dextrose equivalent of 5-25% forms white, glossy, thermoreversible gels with water. The gels have a neutral taste, are stable to freezing and defrosting, have a consistency which can be varied from pasty to cutting hard, and can be used an thickeners.   IFT

50

[Investigations on microorganisms in thickening agents. III. Survival of Escherichia coli, Streptococcus faecalis and Staphylococcus aureus in dried thickening agent.] Untersuchungen über Mikroorganismen in Verdickungsmitteln. III. Lebensdauer von Escherichia coli, Streptococcus faecalis und Staphylococcus aureus in trockenen Verdickungsmitteln.
Souw, P.; Rehm, H. J.
Chemie Mikrobiologie Technologie der Lebensmittel 4 (4) 97-100 (1975) [7 ref. De, en, fr] [Inst. für Mikrobiol., Univ., Münster, Federal

Republic of Germany]

Dried preparations of gum arabic, gum tragacanth, gum karaya, carob-seed flour, guar flour, carrageenan and sodium alginate were sterilized with ethylene oxide, and 2-3 ml from 10-ml suspension of E. coli, Strep. faecalis or coagulase-positive Staph. aureus agar slant cultures were added/10 g of each preparation. The contaminated preparations were stored for ≤12 wk at 22°C, and survival of the 3 species was determined at intervals. The results are graphically presented. Numbers of microorganisms decreased progressively during storage. No microorganism survived in gum karaya beyond 3 wk. Staph. aureus was the most sensitive and generally died out in all preparations before the end of storage; E. coli was the most resistant and is recommended as an indicator of faecal contamination of thickening agents. [See FSTA (1976) **8** 7T306 for part II.] SKK

51

[Microorganisms in thickening agents. IV. Microbial degradation of three plant exudates and two seaweed extracts.] Microorganismen in Verdickungsmitteln. IV. Mikrobieller Abbau von drei Pflanzenexudaten und zwei Meeresalgenextrakten.
Souw, P.; Rehm, H. J.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung **159** (5) 297-304 (1975) [25 ref. De, en] [Inst. für Mikrobiol., Univ., Münster, Federal Republic of Germany]

Preparations of (i) gum tragacanth, (ii) gum arabic, (iii) gum karaya, (iv) carrageenan and (v) alginate were sterilized with ethylene oxide, made into 0.5% aqueous solutions, and the solutions were inoculated with 5 ml spore suspensions from agar slants of Bacillus coagulans, B. lentus, B. cereus, B. licheniformis, and B. firmus respectively. 2 ml trace-element solution were added/l. substrate, and the mixtures were incubated with shaking at 30°C for 14 days, samples being taken at 48-h intervals for analysis. Examination was by gel filtration on Biogel P2, viscosity measurements, TLC, GLC and IR spectroscopy. The results are tabulated and graphically presented. All microorganisms tested caused degradation; differences in activity for different substrates are discussed. Apart from the known monomers of (i)-(v), no other monosaccharides were detected in the incubates. (iii) and (v) were degraded to high-mol. wt. products; (iv) was broken down to oligosaccharides with mol. wt. of approx. 500, 3,6-anhydrogalactose was also identified; (ii) was degraded to rhamnose and arabinose; and (i) was degraded partly to arabinose and xylose and partly to polysaccharides of mol. wt. <3000. SKK

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FAB 42

THICKENERS AND GELLING AGENTS

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FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

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H. BROOKES

ASSISTANT EDITOR

1

[Nutritional study of the membranes of Saccharomyces cerevisiae. I. Chemical composition and viscosity.]
Adrian, J.; Frangne, R.
International Journal for Vitamin and Nutrition Research **46** (2) 115-124 (1976) [18 ref. Fr, en] [Cent. de Recherches sur la Nutr., CNRS, Bellevue, France]

After enzymic auto-degradation of yeast cytoplasm, the residue contained a thick wall and a thin plasma membrane. The composition of the total membranes (DM basis) was: 20.5% protein, 31.5% lipid, 42.0% glucides, and 3.7% ash. The more easily hydrolysable carbohydrates accounted for about 85% of the carbohydrates. Proteins contained 6.9% lysine, 6.35% threonine, but only 1.45% methionine (which is 57% less than in egg protein). The proteins appeared resistant to Maillard reaction, and were not changed by homogenization or fluidization. % in vitro digestible lysine increased when the membranes had been submitted to heat of a certain intensity. Methods of treatment may give membranes an important apparent viscosity, so they could be used as thickeners and gellifying agents in low calorie foods, sauces, puddings, imitation meats, dairy products. AL

2

[Some rheological properties of gels of heat gelatinized (swelling) starches.]
Levochkina, L. V.; Lovacheva, G. N.
Sakharnaya Promyshlennost' **49** (12) 55-58 (1975) [Ru] [Moskovskii Inst. Narodnogo Khozyaistva im. G. V. Plekhanova, USSR]

Results are given of measurements of the rheological properties of gels of 3 types of heat gelatinized starch produced for the food industry, i.e. (i) corn, (ii) amylopectin, and (iii) phosphate-amylopectin starches. The studies were made with improved apparatus, and gels were held in cells of the apparatus at laboratory temp. for 2 h. The (iii) gels were most stable. STI

3

[Extraction and determination of different carbohydrates and their derivatives from oil seeds.] [Lecture]
Guilbot, A.; Tollier, M. T.
Revue Francaise des Corps Gras **23** (6) 322-330 (1976) [30 ref. Fr, de, en, es] [Sta. de Biochimie & Physicochimie des Cereales CERDIA, INRA, 91305-Massy, France]

2 methods for separation and determination of the main carbohydrate fractions of oilseeds are outlined. Results obtained for rapeseed and sunflower, and distribution of the fractions between the hulls and cotyledon + embryo are tabulated and compared with the values obtained for soybeans by other authors and values for cellulose fibre and lignin obtained by conventional methods. The % composition (sucrose, γ-galactosides, soluble and insoluble hemicelluloses, cellulose, lignin, protein, ash) of the 3 oilseeds is shown in histograms and a table. Apart from use for animal feeding, the oilseed cakes could be a source of hemicellulose compounds for use as thickening or gelling agents in the food industry. RM

4

Stabilizers. III. Starch based stabilizers - hydrocolloids of increasing versatility.
Anon.
Food Processing **37** (5) 52-56 (1976) [En]

The use of various starches and modified starch materials as stabilizers and viscosity modifiers is discussed. The methods of chemical modification applied to starches are considered, and the advantages in terms of improved ingredient functionality are described. Commercially available starch stabilizers and sources of information about them are also listed. [See FSTA (1976) **8** 9T410 for part II.] JRR

5

Starch thickener.
Nissin Shokuhin Co. Ltd.
British Patent 1 442 149 (1976) [En]

Starch thickeners are prepared by treating starch powder with an aqueous enzyme composition containing amylase, protease and NaCl. IFT

6

Examination and analysis of starch and starch products. [Book]
Radley, J. A. (Editor)
vii + 220pp. ISBN 0-85334-692-5 (1976) [many ref. En] Barking, Essex, UK; Applied Science Publishers Ltd. Price £15.00

This book covers important changes resulting from recent technological developments and the examination of new starch products which have become available. Chapters in the book are: The microscopy of starch, by G. E. Moss (pp. 1-32, 36 ref.); Electron microscopy of starch and starch products, by D. J. Gallant & C. Sterling (pp. 33-59, 129 ref.); The rheology of starch, by A. H. A. de Willigen (pp. 61-90, 162 ref.); Physical methods of characterising starch, by J. A. Radley (pp. 91-131, 144 ref.); Chemical analysis of raw and modified starches, by F. A. Lyne (pp. 133-165, 82 ref.); Determination of starch in various products, by F. A. Lyne (pp. 167-188, 113 ref.); and The analysis of starch derivatives, by J. van der Bij (pp. 189-213, many ref.). AL

7

A model for starch-sugar paste texture prediction.
Olkku, J. E.
Dissertation Abstracts International, B **37** (1) 147-148: Order No. 76-14653 (1976) [En] [Univ. of Massachusetts, Amherst, Massachusetts, USA]

A set of models predicting texture parameters from recipe parameters (% starch from flour solids, %

flour solids from flour-sugar solids, % water) and processing parameters (rate of shear, temp. above gelatinization temp., time after gelatinization) was developed. In general, a second-order polynomial with cross products was found to give a statistically significant model for prediction of instrumentally measured texture parameters over a range of deformation speeds. The sets of independent variables and their combinations that appear in models created by a selective regression method for the factorially designed experiments were not the same for each deformation speed, indicating the importance of the deformation speed used in instrumental texture measurements. The gelatinization temp. of the mixtures were a linear function of the sugar % in the sugar-total water mixture, and in an attempt to model torques during cooking the lack of fit for equations of similar form of texture parameters was statistically significant. Wheat flour gluten seemed to have a shielding effect on the appearing second low viscosity rise during cooking. JA

8

[The starch of babacu nut - some properties of the granules and of the pastes.]
Tiomno Rosenthal, F. R.; Correa Espindola, A. M.
Revista Brasileira de Tecnologia **6** (4) 307-315 (1975) [7 ref. Pt, en] [Lab. de Amido, Inst. Nacional de Tecnologia, Av. Venezuela 82, Rio de Janeiro, Brazil]

The babacu nut consists of 58% endocarp, 23% fibrous amylaceous mesocarp, 12% fibrous epicarp and 7% seed. The mesocarp contains 68.3% starch, 14.9% moisture, 2.93% hemicellulose, 2.96% pentosans, 2.41% fibre, 1.54% protein, 1.25% soluble carbohydrates, 1.1% ash and 0.27% fat. The starch gelatinization temp. is in the range 63-73°C; solubility curves and Brabender viscosity curves are similar to those of corn starch. Various technological applications are suggested for babacu starch pastes. Potential food applications include use as thickening agents (where short, well-textured opaque pastes with good gelling characteristics are required, e.g. puddings, soups, sauces and fillings); and for increasing the solids contents of canned foods, frozen desserts and fruit preserves. HBr

9

Rheology of xanthan gum solutions.
Whitcomb, P. J.; Ek, B. J.; Macosko, C. W.
Abstracts of Papers, American Chemical Society **172**, CARB 50 (1976) [En] [General Mills Chemicals Inc., 2010 E. Hennepin Ave., Minneapolis, Minnesota 55413, USA]

Viscosity of aqueous solutions of xanthan gum was studied over a wide range of shear rate and concn. At sufficient dilution and low shear rates, xanthan solutions show a region of Newtonian viscosity behaviour. Conc. solutions appear to show a yield stress. The pseudoplasticity increases (power law index decreases) systematically with concn. These results with preliminary, normal-stress data and effects of salt concn. are discussed in terms of the structure of this polysaccharide in solution. AS

10

Some rheological properties of gum solutions.
Elliott, J. H.
Abstracts of Papers, American Chemical Society **172**, CARB 49 (1976) [En] [Res. Cent., Hercules Inc., Wilmington, Delaware 19899, USA]

Gum solutions show pseudoplastic or shear thinning behaviour. Consequently, a knowledge of viscosity as a function of shear rate over a broad range of shear rates is needed for the selection of gum systems for specific end uses. Instrumentation necessary to obtain these data is discussed. The various regions of the viscosity-shear rate curve and their dependence on mol. wt., structure, concn., ionic functionality, and ionic strength of the medium are described. Supermolecular structure is often present in gum solutions, leading to thixotropic behaviour and the presence of a yield stress. The fudamental difference between steady and oscillatory shear measurements on such systems is emphasized. The importance of rheological properties in end uses is illustrated by examples of gums in food systems. Friction reduction in turbulent flow by polymers is briefly reviewed. AS

11

[Effect of protein on the gelatinization of starch.]
Yagi, K.; Okamoto, K.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 50 (7) 417-419 (1976) [12 ref. Ja, en] [Dep. of Food Sci., School of Home Economics, Kobe Coll., Nishinomiya, Japan]

The effects of various proteins on the gelatinization of various starches were investigated by amylograph. The effects were observed to be diverse in different combinations of starch and protein, in variable protein-starch ratio, and with different starch concn. Heat denaturation of proteins also showed a diverse effect on different starches. Although no distinct principles were found to explain these diversities, it seems likely that corn and potato starches are in direct opposition and waxy counterparts situated midway between them. AS

12

Method for producing starch hydrolysis products for use as food additives.
Richter, M.; Schierbaum, F.; Augustat, S. **German Democratic Republic**, Akademie der Wissenschaften
United States Patent 3 986 890 (1976) [En]

A starch hydrolysis product-containing mixture is prepared to yield a thickener, which forms a white, glossy thermoreversible gel with water, has a neutral taste, is freeze-frost stable and has a consistency varying from pasty to hard depending upon the proportion of water. IFT

13

[Edible gelatin - always a pure food?]
Speisegelatine - ein stets reines Lebensmittel?
Honegger, H. U.
Deutsche Lebensmittel-Rundschau **72** (11) 379-383 (1976) [13 ref. De, en, fr] [Deutsche Gelatine-Fabriken Stoess & Co. GmbH, 6930 Eberbach/Baden, Federal Republic of Germany]

The purity and microbiological quality of edible gelatin is discussed, with reference to: the description 'edible gelatin'; current and proposed legislation for the purity of gelatin; the present situation with commercially available gelatin; current problems (presence of inhibitory compounds, heavy metals and excessive bacterial counts); and measures for improvement of the situation. Most samples of currently available edible gelatin are of good quality. AJDW

14

[Determination of melting temperature in gelatine-water system.]
Panina, N. I.; Aver'yanova, V. M.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 3, 136-138 (1976) [14 ref. Ru] [Saratovskii Gosudarstvennyi Univ., USSR]

In connection with the production of food gels, a mathematical method of differential temp. analysis for determining the mp of a gelatine/water system at 0.0-15% concn. intervals is given. Changes in the enthalpy can be calculated from the lowering of the mp when a solvent is introduced into the system. The method offers a rapid, accurate appreciation of the state of a gelatine/water system. STI

15

Natural gums for edible purposes. [Book]
Lawrence, A. A.
Food Technology Review, Noyes Data Corporation No. 36, xii + 338pp. ISBN 0-8155-0631-7 (1976) [En] Park Ridge, New Jersey, USA; Noyes Data Corp. Price $39.00

This book is based on US patents issued since the early 1960's that deal with natural gums for edible purposes. The information is arranged under the following headings: Arabinogalactan (pp. 3-16) including process modifications and uses; Galactomannans (pp. 17-57); Pectins (pp. 58-103) including preparation and uses in jelly compositions, medicines, and baked goods; Gums from other land plants (pp. 104-131) including tragacanth, tamarind polysaccharide, and gum arabic; Alginates (pp. 132-186) including alginic acid and alginate preparations, improving properties of alginates, alginate desserts gels and milk puddings, and other uses; Carrageenans (pp. 187-237) including extraction techniques, dessert gels and other uses; Material from other marine sources (pp. 238-251) including agar and furcellaria extract; Xanthomonas hydrophilic colloid (pp. 252-302); Other microbial polysaccharides (from Arthrobacter microorganisms, Sclerotium moulds, Alcaligenes faecalis, and Azotobacter vinelandii) (pp. 303-318); and Miscellaneous reactions and products (pp. 319-329). Company, inventor and US patent number indexes are included. VJG

16

Rheological properties of pectate gels.
Mitchell, J. R.; Blanshard, J. M. V.
Journal of Texture Studies **7** (3) 341-351 (1976) [14 ref. En] [Dep. of Applied Biochem. & Nutr., School of Agric., Univ. of Nottingham, Loughborough, LE12 5RD, UK]

Creep compliance measurements were made on calcium pectate gels using a parallel plate viscoelastometer. Linear viscoelastic behaviour was observed and the response was consistent with a model containing a Maxwell element in series with 3 Voigt elements. When gels were prepared with the Ca level necessary for max. gel strength a linear relationship was found between the reciprocal of the creep compliance and the square of the polysaccharide concn. The rheological behaviour of pectate gels had many similarities to gels prepared from alginates containing a high proportion of guluronic acid residues. However, pectate gels were more sensitive to Ca ions than alginate gels and at high Ca levels the Newtonian viscosity of the pectate gel was much higher than that found for the alginates. These differences have been interpreted in terms of the structure and mol. wt. of the 2 polymers. AS

17

[Viscoelasticity of hydrogels of agar-agar. Analysis of creep and stress relaxation.]
Isozaki, H.; Akabane, H.; Nakahama, N.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **50** (6) 265-272 (1976) [13 ref. Ja, en] [Dep. of Food & Nutr., Japan Women's Univ., Bunkyo-ku, Tokyo, Japan]

Measurement of creep and stress relaxation of agar, egg white and soybean gels were made with a parallel plate viscoelastometer and a Rheolometer. The creep and relaxation curves of all gels can be approximated by a 6-element Kelvin-Voigt method (KV) or a 6-element Maxwell model (M). Transformation formulae for constants between the KV and M models are calculated. [From En summ.] JRR

18

[Freeze-drying of model solutions containing various quantities of pectin, at constant surface temperature.]
Lerici, C. R.; Maltini, E.; Testa, G.
Annali dell'Istituto Sperimentale per la Valorizzazione Tecnologica dei Prodotti Agricoli **6**, 109-119 (1975) [14 ref. It, en] [Istituto di Ind. Agrarie, Univ. di Bologna, Bologna, Italy]

A description is given of freeze-drying trials (at constant surface temp.) with a series of samples of pectin gels differing in TS, pectin and glucose/fructose contents. Graphs and tables are given showing freeze-drying rate, water loss, thermophysical properties of the gel etc. in relation to gel composition and the thickness of the dried gel layer. Freeze-drying rate tends to decrease with increasing TS concn. during the period of drying at constant velocity, but increases with increasing TS concn. during the period of decreasing velocity. This phenomenon is discussed in relation to the thermal conductivity of the dried layer. Experimental results agreed well with theoretical considerations. AJDW

19

[Production of sugar confectionery.] Verfahren zur Herstellung von Zuckerwaren.
A. Stephan & Söhne GmbH & Co.
German Federal Republic Patent Application 2 501 933 (1976) [De]

The ingredients are mixed mechanically, heated and, if necessary, dried. Mixing is at 1500-3000 rev/min, and heating is simultaneously carried out by introducing saturated steam, preferably superheated steam, into the composition. A temp. of approx. 140° C is reached. The process can be used to make hard caramels, soft caramels, jellies and gums. W&Co

20

[Carrageenan: a hydrocolloid highly reactive with milk proteins.]
Vanni, F.
Mondo del Latte 30 (10) 654-655 (1976) [It]

The structure of carrageenan is discussed in the light of research by various workers (ref. not given), and details are given of its application in the production of milk-based puddings (about 2 g carrageenan are sufficient to jellify half a litre of milk boiled for 1-2 min, then allowed to cool). Market prospects for this type of product in Italy are briefly reviewed. It is estimated that production is increasing by >10%/yr, and annual consumption is about 100 million puddings (involving 50 million l. milk). Since the corresponding figures in France and Germany are much higher, it is considered that there is considerable further scope for the product in Italy. ADL

21

Rheological properties of alginate gels.
Mitchell, J. R.; Blanshard, J. M. V.
Journal of Texture Studies 7 (2) 219-234 (1976) [17 ref. En] [Food Sci. Lab., Dep. of Applied Biochem. & Nutr., Univ. of Nottingham, School of Agric., Sutton Bonington, Loughborough, Leics. LE12 5RD, UK]

Rheological properties of alginate gels formed in various ways were studied using a parallel plate viscoelastometer and an Instron. All the gels studied exhibited linear viscoelastic behaviour. The creep compliance-time response was fitted by a model consisting of a Maxwell element in series with 2 or 3 Kelvin-Voigt elements. Despite the fact that alginate gels are non-thermoreversible the crosslinks do not appear to be permanent. Gels formed with an alginate containing a high proportion of mannuronic acid residues are weaker and more elastic than gels prepared with an alginate predominantly composed of guluronic acid residues. When the level of Ca in the gel was high, the reciprocal of the creep compliance was proportional to the square of the polysaccharide concn. A reduction in Ca level for a given polysaccharide concn. resulted in a more elastic gel. The nature of the temp. dependence varied with the degree of crosslinking and time of measurement after application of stress. The results were explained by assuming that the creep compliance could be regarded as the sum of 2 components: a time independent factor given by the theory of rubber elasticity, or some modification of this, and a time dependent factor associated with the breakage of crosslinks. AS

22

[Alginates and carageenans. Similarities and differences.] [Lecture]
Dano, J.-H.
Rivista Italiana Essenze, Profumi, Piante Officinali, Aromi, Saponi, Cosmetici, Aerosol 58 (6) 318-321 (1976) [Fr] [Pierrefitte-Auby, 46 Rue Jacques-Dulud, 92200 Neuilly-sur-Seine, France]

Comparisons are made between alginates, agars, furcellaran (Danish agar) and carrageenans with respect to: sources; detailed chemical structure (galactose, anhydro-galactose, mannuronic, pyruvic or guluronic acid units); mode of extraction from algae (freezing-thawing of aqueous extracts, alkaline extraction, alcoholic extraction, KCl precipitation); solubility in water; effect of electrolytes (Ca, Na, K); and properties of gels (firmness, thermoreversibility and reaction with proteins). Specific food applications are mentioned only briefly. ELC

23

[Gellifying composition.]
Jules Morey et Fils SA
French Patent Application 2 290 159 (1976) [Fr]

A jelly for commercial thickening and binding of food preparations consists of a combination of a glucidic polymer of mol. wt. >100 000, such as XB-23 biopolymer (Rhone-Poulenc), a potassium salt (e.g. chloride or polyphosphate) and a vegetable thickener or emulsifier, e.g. from carob bean. W&Co

24

[The effect of purity of pectin preparations on their physico-chemical and complex-forming properties.]
Moiseeva, V. G.; Zaiko, G. M.
Izvestiya Vysshikh Uchebnykh Zavedenii. Pishchevaya Tekhnologiya No. 3, 27-30 (1976) [5 ref. Ru] [Krasnodarskii Politekh. Inst., USSR]

Industrial pectin made from sulphite-treated apple cake was purified by solution in water, filtering and dripping through KU-2 ion exchanger resin. The product was studied for composition (amino acids, saccharides, contents of Sr and ash), gelling property, mol. wt. and the content of free carbonyl groups. Purification improves the gelling ability (from the original 193 to 525 mm Hg column). The ash is reduced from 0.96 to 0.18% and reduction is also observed of polyphenolic substances, polysaccharides and amino acids; the pectin content in the powder rises by 13%. The ability of the pectin preparation to form a pectin-strontium complex rises by 9%. STI

25

Acacia (gum arabic); affirmation of GRAS status as a direct human food ingredient with specific limitations, and as an indirect human food ingredient.
United States of America, Food & Drug Administration
Federal Register **41** (236, Dec. 7) 53608-53609 (1976) [En] [Washington, DC, USA]

The US Food & Drug Administration is affirming that acacia (gum arabic) is generally recognized as safe (GRAS) as a direct human food ingredient with limitations from 1.0 to 85.0% for various purposes in specified foods. It is also GRAS as a component of food-packaging materials. CAS

26

Karaya gum (sterculia gum); affirmation of GRAS status with specific limitations as a direct human food ingredient.
United States of America, Food & Drug Administration
Federal Register **41** (236, Dec. 7) 53609-53611 (1976) [En] [Washington, DC, USA]

The US Food & Drug Administration is affirming that karaya gum (sterculia gum) is generally recognized as safe (GRAS) as a direct human food ingredient with limitations up to 0.9% as a formulation aid, emulsifier, stabilizer and thickener. CAS

27

Food additives. Gum tragacanth; affirmation of GRAS status with specific limitations as a direct human food ingredient.
United States of America, Food & Drug Administration
Federal Register **41** (236, Dec. 7) 53617-53619 (1976) [En] [Washington, DC, USA]

The US Food & Drug Administration is affirming that gum tragacanth is generally recognized as safe (GRAS) as a direct human food ingredient as an emulsifier, formulation aid, stabilizer and thickener at levels of 0.1-1.3% in specified food categories. CAS

28

Food additives. Gum ghatti; affirmation of GRAS status with specific limitations as a direct human food ingredient.
United States of America, Food & Drug Administration
Federal Register **41** (236, Dec. 7) 53619-53620 (1976) [En] [Washington, DC, USA]

The US Food & Drug Administration is affirming that gum ghatti is generally recognized as safe (GRAS) as a direct human food ingredient at levels of 0.1-0.2% as an emulsifier in beverages and all other food categories. CAS

29

High goals for functional food ingredients.
Havighorst, C. R.
Food Engineering International **1** (5) 41-44 (1976) [En]

The expansion of the Stauffer Chemicals group since 1970 is discussed. The company, which originally produced basic food phosphates, now manufactures a wide variety of food ingredients, e.g. gums, flavour enhancers, protein concentrates. Stauffer's Food Ingredients Division was established in 1973. Operations at 3 of Stauffer's newest production units are briefly outlined with the aid of photographs and flow sheets: whey processing at the Visalia (California) plant; production of alginate gums from kelp at the Oxnard (California) plant; and monosodium glutamate production at the San Jose (California) plant. JA

30

Rheological properties of cranberry cell wall material.
Holmes, A. B.; Gilbert, S. L.; Rha, C. K.
Journal of Food Science **42** (1) 29-31 (1977) [10 ref. En] [Dep. of Nutr. & Food Sci., Massachusetts Inst. of Tech., Cambridge, Massachusetts 02139, USA]

Rheological properties of cell wall material suspensions recovered from pressed cranberries were studied with rotational viscometers at 25°C. The general power law equation was found to be an adequate model, the flow behaviour index decreasing, and the consistency coeff. and yield stress increasing, as concn. increased. Time dependency and pseudoplastic or mixed-type flow behaviour were observed. Large yield stresses at low concn. suggested potential use of cell wall material as a food thickener. IFT

31

Industrial uses of starch and its derivatives. [Book]
Radley, J. A. (Editor)
vii + 268pp. ISBN 0-85334-691-7 (1976) [many ref. En] Barking, Essex, UK; Applied Science Publishers Ltd. Price £15.00

This book provides practical and theoretical details concerning the uses of starch in the adhesives, food, textile, paper and miscellaneous industries. Chapters include: Adhesives from starch and dextrin (pp. 1-50, 147 ref.); The food industry (pp. 51-115, 354 ref.); The role of starch in bread staling, by E. M. A. Willhoff (pp. 117-147, 190 ref); and Utilisation of the by-products of starch manufacture (pp. 253-258, 22 ref.). [See also FSTA (1977) 9 2L154 and 3L247 for books written contemporaneously by the same author and which together provide a wide coverage of starch technology and chemistry.] AL

32

Viscosity of aqueous solutions of gum ghatti.
Jefferies, M.; Pass, G.; Phillips, G. O.
Journal of the Science of Food and Agriculture 28 (2) 173-179 (1977) [15 ref. En] [Dep. of Chem. & Applied Chem., Univ. of Salford, Salford M5 4WT, UK]

Gum ghatti contains a soluble gum and an insoluble gel which partially dissolves on boiling. Maceration of the gel in water gives a perfectly stable dispersion which for practical purposes behaves as a solution. The viscosity of the gel dispersion is approx. 10-30 times that of the soluble gum. The proportion of gel in 4 commercial batches of gum ghatti varied from 8 to 23%. The viscosity of the whole gum dispersion depends largely on the proportion of gel. The viscosity of gum ghatti can be closely controlled by blending to a fixed proportion of gel. AS

33

[Qualitative and quantitative GLC determination of polysaccharide thickeners.]
Gaschromatographische Verfahren zur qualitativen und quantitativen Bestimmung von polysaccharidhaltigen Dickungsmitteln. [Lecture]
Mergenthaler, E.; Scherz, H.
Lebensmittelchemie und Gerichtliche Chemie 31 (1) 8-9 (1977) [De] [Deutsche Forschungsanstalt für Lebensmittelchemie, 8000 Munich 40, Federal Republic of Germany]

The method involves the following steps: isolation of thickeners from foods, separation by fractional precipitation or ion exchange chromatography, hydrolysis, and production of aldonitrile acetate derivatives by heating with hydroxylamine and acetic acid. These derivatives are stable and show a single GLC peak for each sugar. All the monosaccharide residues are clearly separated, and determined quantitatively from their peak areas. 80% recoveries were obtained for neutral polysaccharides from guar, carob bean flour and methyl cellulose. Uronic acid residues are converted to the corresponding aldoses prior to derivatization and determined via the peak areas before and after reduction. Detn. of polysaccharide mixtures of mixed components built up from identical units required additional analysis by methylation; this allowed identification of a mixture of guar and agar. No satisfactory results were obtained for quantitative detn. of pectin and algin, but tragacanth and gum arabic were determined as accurately as neutral polysaccharides. RM

34

Ultrastructure of carrageenan sols/gels.
Hood, L. F.; Allen, J. E.
Abstracts of Papers, American Chemical Society 170, CARB 18 (1975) [En] [Dep. of Food Sci., Cornell Univ., Ithaca, New York 14853, USA]

The ultrastructural properties of carrageenan-milk sols/gels were studied by 3 transmission electron microscopy procedures: thin sectioning, frozen thin-sectioning, and freeze etching. κ-λ carrageenan blends, purified κ, or purified λ were investigated. Gels formed by strong gelling κ-λ blends differed from those formed by weak-gelling blends in the degree of casein micelle packing. The relative proportions of 3,6-anhydro-D-galactose to ester sulphate groups in κ carrageenan influenced the subunit packing in the micelles and the carrageenan matrix among micelles. Discrete carrageenan fibrils were evident in the fixed (thin sectioned) gels, whereas nonfibrillar linkages existed among micelles in the frozen thin-sectioned gels. The method of preparation for electron microscopy significantly influenced the ultrastructural properties of the sols/gels. AS

35

Functional properties of a soy concentrate and a soy isolate in simple systems and in a food system. Emulsion properties, thickening function and fat absorption.
Hutton, C. W.; Campbell, A. M.
Journal of Food Science 42 (2) 457-460 (1977) [13 ref. En] [Agric. Exp. Sta., Univ. of Tennessee, Knoxville, Tennessee 37916, USA]

Emulsion stabilizing activity and thickening function of a soy protein concentrate and isolate were evaluated at pH 5.0, 6.0 and 7.0 and at 4°C, ambient temp. (22-25°C) and 90°C; fat absorption was evaluated as a function of temp. pH and temp. effects on emulsion stability and on apparent viscosity were interdependent. Fat absorption was dependent on protein content of the soy sample. The concentrate and isolate differed as to magnitude of response to treatments. Functional performance of the concentrate and isolate in a food system did not necessarily parallel that in simple systems. IFT

36

Ordered conformations of gel-forming polysaccharides obtained by X-ray diffraction analyses of oriented fibers.
Arnott, S.
Abstracts of Papers, American Chemical Society 170, CARB 17 (1975) [En] [Dep. of Biol. Sci., Purdue Univ., W. Lafayette, Indiana 47907, USA]

The texture of many food materials is often intimately connected with the ability of their polysaccharide components to form gels. One mechanism of gel formation involves association of chain segments in such a way that a 3-dimensional framework is formed that is capable of sequestering relatively large vol. of solvent. The associated regions are known as junction zones and may involve 2 or more chains. X-ray diffraction analysis of oriented fibres of appropriate polysaccharides provides detailed models of the kinds of interactions between chains that stabilize junction zones. Such models are available for agar, carrageenan, cellulose sulphate, and the glycosaminoglycans of animal connective tissues. AS

37

Metal-polysaccharide complexes.
Rendleman, J. A.
Abstracts of Papers, American Chemical Society **170**, CARB 19 (1975) [En] [N. Regional Res. Lab., USDA, 1816 N. University Street, Peoria, Illinois 61604, USA]

Metal ions can form complexes with carbohydrates in aqueous solution. In general, univalent alkali metals form the weakest complexes. Among the factors that determine complex stability are the nature of the carbohydrate ligand and the charge, radius, and electronic configuration of the metal cation. The disposition and steric arrangement of donor groups in the carbohydrate molecule greatly influence stability. Such nonacidic polysaccharides as starch and cellulose generally form weak complexes in the absence of base: in the presence of base, however, hydroxylic protons are removed, thereby permitting strong complexation between carbohydrate and polyvalent cations. Polyanionic polymers, such as carrageenans, alginate and pectate, react with various metal ions to form gels, some of which find important use in foods. The mechanism of gelation probably involves, in most instances, the formation of a metal complex. AS

38

[Method for producing confectionery creams.]
Baranov, V. S.; Mikhailov, V. S.; Kurbanov, N. G.
Union of Soviet Socialist Republics. Moskovskii Institut Narodnogo Khozyaistva im. G. N. Plekhanova; **Union of Soviet Socialist Republics.** Nauchno-issledovatel'skii Institut Obshchestvennogo Pitaniya
USSR Patent 545 321 (1977) [Ru]

To increase the storage life of confectionery cream without change in its structure, a gelling ingredient is dissolved in a mixture of vegetable oil and water, sugar and egg white are beaten together and added to the solution, flavouring and aromatic additives are added and the mixture is beaten. The gelling ingredient is preferably sugarbeet pectin. W&Co

39

Properties of whey protein concentrate prepared by heating under acidic conditions.
Modler, H. W.; Emmons, D. B.
Journal of Dairy Science **60** (2) 177-184 (1977) [19 ref. En] [Food Res. Inst., Res. Branch, Agric. Canada, Ottawa, Ontario K1A OC6, Canada]

A highly soluble whey protein concentrate (WPC) was prepared by adjusting the pH of sweet whey to 2.5-3.5 and heating at 90° C for 15 min. Upon cooling, the pH was adjusted to 4.5 and the precipitated protein was removed by centrifugation, neutralized to pH 6 and spray dried. Recoveries of total protein were 63-74% and 35-53% for whey heated at pH 2.5-3.5 with and without added Fe (30 mg/l.). WPC prepared by heating at pH 2.5-3 had a min. solubility of 78%. This was reduced to 51% when the pH during heating was 3.5 and by addition of Fe to whole whey. Concentrating whey prior to heating greatly increased protein recovery but substantially reduced solubility. The viscosity of spray-dried samples of acid-heat WPC reconstituted to 33% TS was 4000-36 800 centipoise while commercial samples had viscosities of 400-1840 centipoise. Experimental samples of WPC gelled at protein concn. of 2, 4, 6 and 8% on heating at 95° C for 20 min. All experimental samples had excellent colour stability while commercial samples darkened upon heating. AS

40

[Changes in the casein complex of sweetened condensed milk during storage.]
Yamauchi, K.; Tsukasaki, F.; Kaminogawa, S.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 47 (12) 704-710 (1976) [9 ref. Ja, en] [Fac. of Agric., Univ. of Tokyo, Tokyo 113, Japan]

Sweetened condensed skim-milk (SCSM) was diluted ×3 with water and the casein complex separated by high speed centrifugation. Sephadex G-200 gel filtration of the casein complex in 6M urea solution, yielded 2 components. The proportion of the fast-moving component increased with increasing length of storage of the SCSM (10-30 days at 40° C). When 0.01M mercaptoethanol was present in the urea solution, only small amounts of the fast-moving component were detected in SCSM stored for up to 30 days at 40° C, but after 60 days the fast-moving component predominated. Polyacrylamide gel electrophoresis showed that during storage of SCSM there was a decrease in the α_s-casein band, and the β-casein band became less well defined. It is concluded that 2 types of casein polymerization occurred, one related to S-S bond formation and the other to reactions between amino and carboxyl groups. These changes are thought to be concerned with age-thickening of the SCSM. [From En summ.] MEG

41

[Physico-chemical changes in sweetened condensed milk during storage.]
Noda, K.; Endo, M.; Takahashi, T.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 47 (12) 719-724 (1976) [15 ref. Ja, en] [Res. Inst., Meiji Milk Products Co. Ltd., Higashi-Murayama-shi, Tokyo 189, Japan]

Age thickening and development of a slight brown colour were observed in sweetened condensed milks stored for 3 wk at 40° C or for 1 yr at room temp. Rennet coagulation time increased with increasing storage time, while the content of acid soluble inorganic P decreased from 145 to 110 mg/100 g condensed milk during storage for 21 days. The results indicate that during storage of condensed milk, aggregation of casein micelles occurs and the ionic Ca content decreases. [From En summ.] MEG

42

[Hydrocolloids based on polysaccharides.]
Hydrokolloide auf Polysaccharidbasis. [Review]
Strahlmann, B.
Ernaehrungs-Umschau 23 (11) 331-338 (1976) [18 ref. De, en] [Int. Palsgaard Organisation, DK-7130 Juelsminde, Denmark]

This review-type article deals with structure and properties of polysaccharides with particular reference to those of plant exudates (gum arabic, tragacanth, ghatti gum and karaya gum), seed endosperm (carob, tara, guar and tamarind seeds), seed coat (flax), plant cell-wall (citrus, apple and sugar beet pectins, and larch arabinogalactan), and algal cell-wall (alginates, agar, carrageenan and furcellaran). Spatial formulae of the different compound classes are presented. SKK

43

[Thickening agents from guar seeds and locust beans.] Verdickungsmittel aus Guar- und Johannisbrotkernen.
Wielinga, W. C.
Zeitschrift für Lebensmittel-Technologie und -Verfahrenstechnik 28 (1) 16-22 (1977) [9 ref. De] [Meyhall Chem. AG, Kreuzlingen, Switzerland]

Aspects considered include: processing of guar- and locust bean-based thickeners; changes in the galactomannan content of guar seed during germination; structure of galactomannans of guar and locust bean seeds; rheological properties of guar and locust bean flour solutions; effects of pH, temp. and additives (NaCl, sugars) on the rheological properties of proprietary guar or locust bean based thickeners; and effects of filling method, pH, storage etc. on the viscosity of sauces made with these proprietary thickeners. AJDW

44

Calcium concentration and firmness of stored 'McIntosh' apples increased by calcium chloride solution plus thickener.
Mason, J. L.
HortScience 11 (5) 504-505 (1976) [6 ref. En] [Res. Sta, Agric. Canada, St. Jean, Quebec, J3B 6Z8, Canada]

Dipping 'McIntosh' apples (Malus domestica Borkh.) at harvest in a solution of $CaCl_2$ (4% w/w) and Keltrol, a commercial food thickener, (0.3% w/w), slowed the loss of firmness in cold storage. In Jan., treated apples averaged 0.52 kg firmer and in Feb., 0.73 kg firmer than the controls. Ca concn. of treated apple flesh was 839 ppm, and of controls 304 ppm. A dip of $CaCl_2$ without Ketrol was much less effective in reducing the loss of firmness and in increasing the Ca concn. of the flesh. AS

45

[Algae as a source of additives for use in the food industry.]
Primatesta, G.
Industrie Alimentari 16 (3) 93-96 (1977) [It]

A discussion is given of the source, composition, characteristics and applications of stabilizers, gelling agents and thickening agents derived from Rhodophyceae and Phaeophyceae, including furcellaran, agar-agar, carrageenans, and various types of alginates. AJDW

46

Preparation of a stabilized precooked baby food formulation thickened with modified tapioca starch.
Smalligan, W. J.; Kelly, V. J.; Enad, E. G. Gerber Products Co.
United States Patent 4 013 799 (1977) [En]

47

Stabilizer blend.
Osborne, J. T. General Mills Chemicals Inc.
United States Patent 3 996 389 (1976) [En]

A stabilizer blend of xanthomonas gum (2-8%) and guar gum (92-98%), incorporated in amounts of up to 3.0% in ice cream, ice milk and sherbet mixes, is claimed to impart superior physical properties to the resulting ice cream, when compared with ice creams containing the conventionally used stabilizers. EJM

48

[Cellulose powder. Numerous applications of a new product.] Zellulose-Pulver. Vielseitige Verwendung eines neuen Produktes.
Philipp, B.; Steege, H. H.
Umschau in Wissenschaft und Technik 77 (10) 312-313 (1977) [De, en] [Inst. für Polymerenchemie der Akad. der Wissenschaften, Teltow-Seehof, German Democratic Republic]

A brief discussion is given of cellulose powder (microcrystalline cellulose) with reference to: mechanical and mechanical/enzymic methods for its manufacture; particle size; applications in the food industry (in calorie-reduced foods, as a carrier material in flavouring preparations, and as an emulsifier or stabilizer); gelation characteristics; and the possible hazard of penetration of cellulose particles through the wall of the alimentary tract into the bloodstream. AJDW

49

Process of extracting carrageenan from seaweed.
Uniroyal Ltd.
British Patent 1 457 345 (1976) [En]

This invention relates particularly to an improved method for extracting carrageenan and its fractions from the seaweed genus Rhodophyceae for use in dairy, food and pharmaceutical products, etc. A description of the determination of the aqueous gel strength and 'milk reactivity' (the strength of the gel formed as a result of reaction between the carrageenan and the milk protein) is included.
FL

50

Carrageenan.
Pedersen, J. K.
Gordian 77 (2) 34, 36, 38 (1977) [En] [A/S Kobenhavns Pektinfabrik, Lille Skensved, Denmark]

This review includes sections on raw material source and manufacture of carrageenan, molecular structure, chemical and physical properties of the κ-, λ-and ι- fractions and applications in fruit-in-jelly desserts and chocolate milk (pasteurized or UHT-sterilized). RM

51

[Emulsifiers, stabilizers, thickeners and gelling agents.]
Traisnel, M.
Annales d'Hygiene de Langue Francaise, Medecine et Nutrition 11 (2) 113-115 (1975) [5 ref. Fr] [Fac. de Pharmacie, 59045 Lille, France]

A brief discussion is given of additives used as emulsifiers, stabilizers, thickeners and gelling agents in foods, with special reference to legal aspects in France and the EEC. A table is given showing applications of approx. 40 additives of these types.
AJDW

52

[Carrageenans - interesting polysaccharides from red algae.] Carraghenane - interessante Polysaccharide aus Rotalgen.
Hille, M.
Zeitschrift für Lebensmittel-Technologie und -Verfahrenstechnik 28 (4) 135-138 (1977) [De]

Carrageenans are discussed, with reference to: sources; extraction and purification; structure of carrageenan fractions; chemical and functional properties; gelation characteristics; properties of λ-carrageenan (which does not gel, but may be used as a thickening agent; reaction of carrageenans with proteins; and applications of carrageenans as stabilizers, thickeners and gelling agents in the food industry. AJDW

53

[Gelatine quality. New requirements for purity of culinary gelatine. Quality guarantee.] Gelatine Qualität. Neue Reinheitsanforderungen für Speisegelatine. Gelatine-Qualitäts-Garantie eingeführt.
Anon.
Gordian 77 (3) 70 (1977) [De]

The description of a new brand of commercial culinary gelatin includes the following details of the requirements in new regulations of 14 January, 1977: ash, $<2.5\%$; H_2SO_3, <400 ppm; As, <2 ppm; Cu, <30 ppm; Pb, <5 ppm; H_2O_2, not detectable; total aerobes (tryptone-yeast extract-glucose-agar), $<10\,000$/g; coliforms, 0.1 g; and clostridia, Escherichia coli, not detectable in 1 g. RM

54

[Permissible food gums.]
Iran, Institute of Standards & Industrial Research of Iran
Iran Standard ISIRI 968, 10pp. (1974) [Pe] [PO Box 2937, Tehran, Iran]

55

[Optimum regime for manufacture of low-calorie fruit gels.]
Basamakov, D.
B"lgarski Plodove Zelenchutsi i Konservi No. 4, 12-15 (1977) [12 ref. Bg] [DSO "Bulgarplod", Bulgaria]

To produce low-calorie ($\leqslant 30$ cal/100 g) fruit gels of relatively low water content, carrageenan is added to the basic material at pH 3-4; the concn. used is not critical for the gel strength, but increasing concn. accelerates the gelling rate. KCl (0.5%) has a similar effect. STI

56

A pilot plant starch viscometer.
Voisey, P. W.; Paton, D.
Canadian Institute of Food Science and Technology Journal 10 (2) 120-125 (1977) [1 ref. En, fr] [Res. Branch, Agric. Canada, Ottawa, Ontario K1A OC6, Canada]

A pilot scale steam jacketed kettle was modified to stimultaneously record torque (viscosity) and temp. during the cooking of a 68 kg sample of starch slurry. Results were in good agreement with those obtained from the Ottawa Starch Viscometer (70 g slurry sample) whose design was initially based upon the kettle concept. Results illustrate that both the instrumented kettle and viscometer can be used to predict the cooking performance characteristics of starch slurries. AS

57

[Some properties of starch in hard and soft wheats.]
Semin, O.
Mukomol'no elevatornaya u Kombikormovaya Promyshlennost' No. 12, 33-34 (1976) [Ru] [Zaochnyi Inst. Sovetskoi Torgovli, USSR]

Hard and soft wheat starch properties were studied in the course of gelling. Native starch isolated from Kharkovskaya 46 hard wheat and from Saratovskaya 29 soft wheat from 1968, 1969 and 1974 harvests were used. For these 3 yr respectively, Saratovskaya wheat contained 25, 30 and 27% wet gluten and had a glassiness of 77, 80 and 76%; Kharkovskaya contained 34, 38 and 33.1% gluten and its glassiness was 84, 88 and 90.2%. The starch granules in both soft and hard wheats had the same appearance (size and shape); gelling temp. did not depend on morphological characteristics of the starch grains structure, and was on an average 60°C. The relative viscosity of the gels differed; at 90°C after 75 min the viscosity of gel from native starch of hard wheat was 250 units, and that of gel from soft wheat was 490 units. Changes in viscosity at high temp. were also different and affected considerably the technological properties of the hard and soft wheat grains. STI

58

Production of industrially important gums with particular reference to xanthan gum and microbial alginate. (In 'Sucrochemistry' [see FSTA (1977) 9 11L862].) [Lecture]

Lawson, C. J.

pp. 282-296 (1977) [7 ref. En] [Tate & Lyle Ltd., Group R&D, PO Box 68, Reading RG6 2BX, Berks., UK]

Following general discussion on the production, properties and applications of industrially important gums (including a table showing their consumption for food uses in the USA in 1973), some results obtained in studies on microbial alginate production by Azotobacter vinelandii are discussed, including choice of strains, growth media and fermentation conditions. AL

59

Improvements relating to processes for cooking, extruding and expanding food mixtures.

Isochem SA

British Patent 1 474 394 (1977) [En]

A dried product with 7.27% moisture is prepared by cooking, extruding and expanding a mixture comprising initially 85 parts fine decorticated raw rice or de-germed maize semolina and 15 parts dried milk protein containing 75% whey protein. By crushing and dispersing in cold water a gruel is obtained which remains thick for several hours. Another product covered is suitable for instantaneous thickening of sweet courses containing milk. FL

60

[Gelling and thickening food additives.] Gelier- und Verdickungsmittel als Lebensmittelzusatzstoffe.

Feldmann, G.

Alimenta 16 (4) 113-127 (1977) [24 ref. De] [Unipektin AG, Eschenz, Switzerland]

This review discusses the main food gelling and thickening agents. Their origin, structure, properties and main applications, with conditions for gel formation and possible factors affecting the texture and consistency of foods, are shown in tables. The mechanism of gel formation and applications of gelling and thickening agents and stabilizers in modern food technology are discussed. RM

61

Studies on technological properties of starch phosphate monoesters.

Swiderski, F.

Acta Alimentaria Polonica 3 (2) 115-125 (1977) [16 ref. En, pl] [Dep. of Human Nutr., Warsaw Agric. Univ., Warsaw, Poland]

Modification of corn and potato starches was studied to obtain stable, high viscosity non-gelling thickeners for use in frozen foods, e.g. sauces. Wt. proportions of 2 parts potato starch (P) or corn starch (C) and 1 part water were mixed at room temp. for 15 min with additions of varying proportions of mono- and double-base sodium phosphate and urea, dried at <60°C to water content <20% and roasted at 130-170°C (optimum usually 150° for 3 h for P and 160° for 105 h for C). Equations are given for calculation of additives of phosphate and urea according to the desired viscosity of a slurry of the modified product. Detailed data are given of chemical composition (moisture, ash, total and ester-bound P, and N substances) of natural and modified P and C starches and of the complete change in physical properties. Thus viscosities (cP) of 5% slurries at 20°C were for natural vs. modified: 2800 vs. 26 400 (P) and 2500 vs. 24 100 (C). Slurries (modified) frozen and stored at -20°C for <90 days and thawed at 20°C showed no change of original viscosity and complete freedom from liquid separation or syneresis; natural products gelled in 24 h at -20°C, and exhibited extensive liquid separation and syneresis when thawed. ELC

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FAB 42

THICKENERS AND GELLING AGENTS

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under the direction of

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

ASSISTANT EDITOR

1

Food-grade gelatine - its practical selection and processing.
Schreiber, R.
CCB Review for Chocolate, Confectionery and Bakery **2** (2) 14-15 (1977) [4 ref. En]

Food-grade gelatin must satisfy legal standards of purity and must be free from preservatives. Additionally it must meet practical requirements which vary widely between products and processes; consequently no single grade is suitable for every product. Jelly strength normally determines the price and is best estimated by the standard Bloom method. Viscosity of solutions may be important, e.g. low for some sweets, high for sugar coatings, chocolate centres and stabilizing emulsions. Colour and pH value are variable requirements while bacteriological purity is always important. In addition to choice of grade, processing methods are equally important. Procedures described include dissolving in water (initially cold) without formation of lumps or trapped air bubbles, and special methods with recipe quantities for gums, 'chewy' (elastic) sweets, marshmallows (high strength with low viscosity), foamed products and cream fillings. Bulk storage (sacks or silos) is usually satisfactory with dry, granulated gelatine but more difficult with solutions. Temp. above 60° C, especially with additions of acid lead to breakdown, while microbiological decomposition may occur at 30-40° C. Storage of solutions, if unavoidable, is probably best around 55° C. ELC

2

Foods with microcrystalline chitin.
Dunn, H. J.; Farr, M. P. (Ralston Purina Co.)
United States Patent 4 034 121 (1977) [En]

Microcrystalline chitin is prepared by subjecting shrimp or crab chitin to controlled acid hydrolysis and high shear while suspended in an aqueous medium. It is used as a thickener-stabilizer in frozen foods, e.g. frozen dinners with gravies or sauces and frozen desserts, retort and canned foods, and foods to be kept at room temp., e.g. mayonnaise and peanut butter. GL

3

Agar-agar. Proposed affirmation of GRAS status with specific limitations as direct human food ingredient.
United States of America, Food & Drug Administration
Federal Register **42** (161, Aug. 19) 41876-41878 (1977) [En] [Washington DC, USA]

A summary of the literature related to agar-agar is given. No evidence exists which suggests a hazard to the public when agar-agar is used at current levels. It is not possible to determine whether a significant increase in consumption would constitute a dietary hazard. The FDA proposes to affirm agar-agar as generally recognized as safe (GRAS) with specific limitations. CAS

4

The viscosity of dilute solutions of guar gum and locust bean gum with and without added sugars.
Elfak, A. M.; Pass, G.; Phillips, G. O.; Morley, R. G.;
Journal of the Science of Food and Agriculture **28** (10) 895-899 (1977) [20 ref. En] [Dep. of Chem. & Applied Chem., Univ. of Salford, Salford M5 4WT, UK]

The apparent viscosities of dilute solutions of guar and locust bean gums were measured. The intrinsic viscosity of guar gum solution was greater than that of locust bean gum solution, but the interaction coeff. of guar gum solutions was less than that of locust bean gum. Addition of glucose, sucrose, or glucose syrup increased the apparent viscosity of the gum solution. The intrinsic viscosity of the gum solution was decreased but the interaction coeff. was increased. AS

5

Soft confections made with pectin.
Heinz, E.
CCB Review for Chocolate, Confectionery and Bakery **2** (3) 35 (1977) [En]

Soft confectionery made with pectin can be varied in texture according to the gelatin:pectin ratio. Texture depends on the proportion of sugar, pectin, gelatin, acid and moisture; a large % of pectin gives a softer product. Setting of pectin depends on sugar concn. and pH. Recipes are given for gelatin/pectin jellies and gums. SP

6

A microscopic view of thermal-processed wheat flour.
Hansen, L. P.; Jones, F. T.
Journal of Food Science **42** (5) 1236-1242 (1977) [18 ref. En] [USDA W. Regional Res. Lab., Albany, California 94710, USA]

Protein fibril-formation was lost as a result of heat treatments (108°, 150°, 174° C). Loss of starch granule-birefringence was more rapid in high moisture (33%) than in the low moisture (13%) flours at 108° and 150° C. Alpha-amylase digestion rates of starch increased with processing temp., in general, and were related to heat-produced physical changes. Basic information on starch granule structure of wheat as revealed by heat and enzyme treatments using the light microscope and scanning electron microscope is presented. The possible applications of the heated starches in food systems (including in soups, gravies, breads, cakes and custards) is discussed. IFT

7

Dry food mix.
Unilever Ltd.
British Patent 1 478 843 (1977) [En]

Dry rehydratable soup, sauce and gravy mixes employ as a thickener an agglomerated starch, e.g. raw flour from wheat, corn, pea or rice, which has been coated with fat. IFT

8

[Determination of the degree of gelatinization of starches.] [Review]
Schuchewytsch, G.; Meyer, A. M.
Revue des Fermentations et des Industries Alimentaires 32 (3) 71-78 (1977) [63 ref. Fr, nl] [Lab. des Ind. Agric., Fac. des Sci. Agron., Univ. Catholique de Louvain, Louvain, Belgium]

The sequence of changes during starch gelatinization is discussed. Values obtained for degree of gelatinization of pure starches may not be applicable to the more complex natural products containing other substances. Based on the accepted view that gelatinization is due to progressive dispersion of molecular chains by rupture of H bonds under the influence of heat, methods available for detn. of degree of gelatinization include differential calorimetry (heat of rupture), NMR, X-ray diffraction and turbidity changes; these do not agree well between themselves or with direct microscopical examination of birefringence. Moreover, results vary with botanical origin of the starch, e.g. for the same gelatinization initiation temp., the medium and final gelatinization temp. may be different; data are tabulated. Susceptibility to enzyme action is also related to degree of gelatinization and is only complete in starch pastes taken above the max. gelatinization temp., e.g. from 90-95°C to >100°C. Enzymic methods would avoid many difficulties, given strict control of conditions. Differences between α- and β-amylases and their possible uses are discussed, but glucoamylase is suggested as preferable; this enzyme gives greater liberation of glucose (easily measured) from gelatinized starch and is also independent of linear or branched starch configuration. ELC

9

[Tara kernel meal, a new thickening binding and stabilizing agent.] Tara-Kern-Mehl. Ein neues Verdickungs-Binde- und Stabilisierungsmittel.
Benk, E.
Riechstoffe, Aromen, Kosmetica 27 (10) 275-276 (1977) [9 ref. De] [D 7480 Sigmaringen, Sonnenhalde, Federal Republic of Germany]

The origin, nature, properties, chemical composition, application, health considerations and legal evaluation of tara kernel meal (tara gum) are reviewed. RM

10

Acidified milk gel and method of producing the same.
Igoe, R. S. (Merck & Co. Inc.)
United States Patent 3 996 390 (1976) [En]

The blending of milk with acid food juices (e.g. fruit juice) without causing curdling is facilitated by adding up to 4% of a thickener mixture consisting of 7-22% carboxymethylcellulose and 78-93% gelatin. The food juice remains within the product as a finely divided, widely dispersed mixture without noticeable graininess. EJM

11

The future for corn wet milling.
Casey, J. P.
Food Technology 32 (1) 72-74 (1978) [4 ref. En] [1521 Dogwood Drive, Elkhart, Indiana 46514, USA]

Variations in the consumption of corn syrup and starch since 1940 are discussed and the importance to the corn wet milling industry of the development of high-fructose corn syrups is outlined. Production of new types of starch derivatives for use as low cost stabilizers and thickeners in the food industry is also mentioned. MEG

12

[Hydrocolloids - water binding materials of value in the bakery products industry.] Hydrokolloide - wasserbindende Stoffe für die Backwarenindustrie.
Pulz, O
Bäcker und Konditor 25 (9) 265 (1977) [1 ref. De] [Inst. für Getreideverarbeitung der DDR, Bergholz-Rehbrücke, German Democratic Republic]

The characteristics of the main types of hydrocolloid-based gelling and thickening agents are discussed, together with their applications in the bakery industry. IN

13

Council Directive of 18 June 1974.
European Economic Community, Council of Ministers
Official Journal of the European Communities 17 (L 189) 1-7 (1974) [En]

Council Directive No. 74/329/EEC of 18 June, 1974, relates to emulsifiers, stabilizers, thickeners and gelling agents for use in foodstuffs. Annex I to this Directive lists the emulsifiers, stabilizers, thickeners and gelling agents which may be used in foodstuffs. The Directive does not specify in which foods or under which conditions the permitted substances may be used. Annex II lists emulsifiers, stabilizers, thickeners and gelling agents which Member States may permit until July 1979. VJG

14

Thickening of soy protein suspensions with calcium
Lee, C.-H.; Rha, C.
Journal of Texture Studies 7 (4) 441-449 (1977) [14 ref. En] [Dep. of Nutr. & Food Sci., Massachusetts Inst. of Tech., Cambridge, Massachusetts 02139, USA]

The objective of this study was to increase the apparent viscosity of 1-7% soy protein suspensions using Ca. The thickening effect, measured by apparent viscosity, depended upon the Ca concn. Max. apparent viscosity was obtained with a Ca/protein molar ratio of 20-50 mol Ca required/mol protein (mol. wt. 100 000). The Ca/protein ratio required for max. viscosity decreased with an increase in the protein concn. Effective stirring was necessary during and after Ca addition to attain max. thickening and stability. Heat treatment of the protein suspension prior to Ca addition enhanced the extent of apparent viscosity increase. Higher protein concn. improved stability of the thickened mixture. The established optimum thickening conditions leading to a stable homogeneous suspension involved addition of 12.5mM $CaCl_2$ to 5% protein suspension preheated at 80°C for 30 min. AS

15

Acidified milk product and method of producing the same.

Igoe, R. S. (Merck & Co. Inc.)

United States Patent 4 046 925 (1977) [En]

A gelled milk-fruit juice dessert of improved texture, flavour, stability and keeping quality is obtained by utilizing a new thickener system composed of 30-50% carboxymethylcellulose, 10-45% locust bean gum and 20-50% xanthan gum. The proportions vary according to whether cold or hot processing is involved. The content of thickener composition in the product is 0.65-1.0% when hot processed, and 0.85-1.6% when cold processed. Low-fat (2%) milk desserts may be prepared by this process. EJM

16

[Possibilities of influencing the consistency of milk products using gelatin and starch.] Möglichkeiten der Konsistenzbeeinflussung von Milchprodukten durch Speisegelatine und Stärke.

Thomasow, J.; Hoffmann, W.

Deutsche Molkerei-Zeitung 99 (1) 6-12 (1978) [2 ref. De] [Inst. für Chemie der Bundesanstalt für Milchforschung, Hermann Weigmann-Strasse 1-27, D-2300 Kiel 1, Federal Republic of Germany]

Results of experiments on effect of pH and temp. on firmness of gelatin gels formed from 'Rheinperle Super' (Gelatinfabrik Monzingen, Federal Republic of Germany) gelatin (recommended for yoghurt use) in a salt mixture simulating those present in milk, and on interaction of gelatin and 2 types of gel-forming starch and 1 type of cross-linked highly viscous non-gel-forming starch (Maizena 511, 5051 and 6307, resp.) are presented in detail. In further experiments, 0.4-0.9% gelatin and/or 1.33-3.0% 6307 starch were added to skim-milk; after time allowance for swelling, the mixture was heated to 90°C, held for 5 min and cooled to 45°C, 3% yoghurt culture was added, and the mixture was incubated in cups for 3 h and stored at 5°C. Effects of the different treatments on yoghurt firmness are graphically presented. It is concluded that starch could not be used alone to improve consistency without affecting taste negatively. Addition of 0.6% gelatin or 0.4% gelatin and 0.4-0.6% starch produced very good consistency. SKK

17

Instant thickening gravy, sauce bar - transforms homemaker into sous chef.

McCormick, R. D.

Food Product Development 11 (9) 34, 37-38 (1977) [En]

Standard Brands Incorporated of New York City have begun introductory marketing under a new brand name, Creative Kitchens, with a line of 'semi-convenience' sauce and gravy bars called Smooth & Easy. 3 flavours are included: brown gravy, chicken gravy, and white sauce. To use, the consumer adds a portion of the margarine-like bar to a boiling liquid and stirs briskly for 30 s to obtain instant thickened sauce or gravy products. Technically, the bars can be described as solid-in-fat emulsions in which the starch component is the solid phase and the seasonings have been infused into an oleomargarine oil phase. Product management is positioning the new line against, the dry premix gravies and sauces, a market estimated at $60 million. Consideration is also given to graphics, packaging and merchandising. VJG

18

[Hydrocolloids in the production of fine bakery products.] Hydrokolloide bei der Herstellung Feiner Backwaren.

Menger, A.; Ludewig, H. G.

Getreide, Mehl und Brot 31 (11) 299-301 (1977) [10 ref. De] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Detmold, Federal Republic of Germany]

In fine bakery products hydrocolloids used at a level of 0.05-0.3% flour basis improve pore structure, water binding, gas retention (CO_2 from baking powder), control batter viscosity, and increase tolerance to recipe variation. In the case of waffles and pancakes they improve consistency, adhesion, spreading and surface appearance. In the case of biscuits 0.1% flour basis hydrocolloid controls spreading during baking. An important use of hydrocolloids in fine bakery products is in 'creams', fillings, couvertures and decorations, and many hydrocolloids are of practical importance. Alginate stabilizes, thickens gels and forms films or inhibits syneresis. Carrageenan acts similarly and the gels also have the advantage of being thermally reversible. Starch and modified starches are specially valuable at high temp. and pressures and different pH conditions. Xanthan gum stabilizes, emulsifies and thickens and is stable over wide temp. and pH ranges. It combines effectively with other hydrocolloids (e.g. with carob bean gum). Guar gum, carob bean gum and pregelatinized starch are used chiefly for thickening and stabilizing whereas agar, pectin and gelatin are used for gel and film production. JVR

19

Gums for food uses - a review.

Urquidi, R. L.

International Flavours and Food Additives 9 (2) 73, 75-76 (1978) [12 ref. En] [Tragacanth Importing Corp., New York, New York, USA]

This article reviews the sources of gums and highlights their potential uses in dairy products, beverages, bakery products, dressing sauces, confectionery, dietetic foods, meat products and soups. Types of gum considered are: seed gums; tree exudates; seaweed gums; microbial gums; and cellulose gums. VJG

20

[Special and modified starches. Current aspects of use of starches in food manufacture.]
Spezialstärken und modifizierte Stärken. Eine Betrachtung zur Anwendung von Stärken im Bereich der Lebensmittelherstellung in heutiger Sicht.
Völker, H. H.
Ernährungswirtschaft No. 1/2, 20, 23-26 (1978) [6 ref. De]

The legal status of the use of special and modified starches in foods in the Federal Republic of Germany is discussed. The suitability of various starches as thickening agents for convenience foods, frozen foods, instant products, canned prepared meals, foods for babies, bakery products and confectionery products is considered. Waxy maize, waxy rice and millet starches (which have high amylopectin contents) show good thickening properties, which are, however, susceptible to adverse effects of heat or acids. Normal maize, wheat, potato and tapioca starches contain mainly amylose, and may be used for preparation of gels of various consistencies. The characteristics and applications of various modified starches are discussed. IN

21

Specifications for the identity and purity of some antioxidants, food colours, thickeners and certain other food additives.
Food & Agriculture Organization, Joint FAO/WHO Expert Committee on Food Additives; World Health Organization, Joint FAO/WHO Expert Committee on Food Additives
FAO Nutrition Meetings Report Series No. 57, vi + 157pp. ISBN 92-5-100499-4 (1977) [En] [Rome, Italy]

The contents of this document are the result of the deliberations of the Joint FAO/WHO Expert Committee on Food Additives which met in Geneva on 18-27 April, 1977. It gives specifications (some of them tentative) covering synonyms, definition, description, functional uses, characteristics and method of assay for the following additives: activated vegetable carbon, Allura Red AC, Al powder, anthocyanin colour from grape skin, azorubine, benzoin gum, Brilliant Black PN, BHA, BHT, caramel colour (plain, ammonia process and ammonia-sulphite process), carmine (aluminium lake and aluminium calcium lake of carminic acid), carthamus red, carthamus yellow, chlorophyllin Cu complex (Na and K salts), Chocolate Brown HT, citranaxanthin, diatomaceous earth, Fast Red E, Food Green S, karaya gum, lactic acid, Lithol Rubine BK, mineral oil, mixed tocopherols concentrate, Patent Blue V, Ponceau 4R, quinoline yellow, Red 2G, saffron, sucrose acetate isobutyrate, L(+)-tartaric acid, DL-tartaric acid, tertiary butylhydroquinone (TBHQ), titanium dioxide, α-tocopherol, tragacanth gum, xanthan gum, xylitol, and Yellow 2G. Annexes give methods for detn. of aromatic amines and dye content in synthetic food colours. AL

22

[Microcrystalline cellulose Avicel® RC is finding increasing uses in frozen desserts.] Die Mikrokristalline Zellulose Avicel® RC findet zunehmend Verwendung für Gefrierdesserts.
Anon.
Deutsche Molkerei-Zeitung 99 (24) 804 (1978) [De]

The product is a pure form of α-cellulose obtained by comminuting natural plant fibres to very small particles, and containing about 10% sodium carboxymethyl cellulose. Major uses are in dietetic dishes, and frozen confectionery, such as frozen yoghurt or ice cream, and in milk shakes. The chief function is to improve consistency and prevent the growth of crystals. FL

23

Glucosylsorbitol adds bulk without sweetness, calories.
Layton, R. M.; Vlazny, J. C.
Food Product Development 12 (2) 53 (1978) [En] [G. D. Searle & Co., Skokie, Illinois, USA]

G. D. Searle & Co initiated an artificial sweetener programme in 1970 to produce an agent which would reproduce the physical properties of sugar but not its sweetness and caloric content. This led to the development of a new, non sweet, non-caloric bulking agent-glucosylsorbitol. The development, functionality and applications of this bulking agent/water binder are discussed. VJG

24

Analytical ultracentrifugation of carrageenan with computerized analysis.
Wright, B. B.
Dissertation Abstracts International, B 37 (8) 3851-3852: Order No. 77-2539 (1977) [En] [Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

The effects of heat and acid treatments on the mol. wt. distribution in a carrageenan (similar to κ-carrageenan) were studied. The carrageenan had mol. wt. components of 80 000-90 000 and 325 000, with a wt. average mol. wt. of 270 000. Autohydrolysis at 60° C at pH 2.4 for 10 min reduced wt. average mol. wt. to 160 000; autohydrolysis for 49 h resulted in complete hydrolysis to dialysable components. Samples heated at 122° C at pH 6.7 for 10 or 20 min still showed, on ultracentrifugation, low mol. wt. (80 000-90 000) components; the high mol. wt. component decreased from 325 000 to 260 000. All sedimentation equilibrium data were analysed by a specially written computer programme. DIH

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FAB 42

THICKENERS AND GELLING AGENTS

SELECTED FROM VOLUME 11
FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Gesellschaft fur Information und Dokumentation, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen.

INTRODUCTION

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Copies of all original articles referred to in the abstracts may be bought (or occasionally borrowed) from the International Food Information Service. A form for ordering these is provided at the end of this FAB.

Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

EDITOR

1

1

Process for preparing water-absorbing cross-linked starch derivatives.
Unilever Ltd.
British Patent 1 508 570 (1978) [En]

Water absorbing, crosslinked starch derivatives useful as bulking agents in dietetic foods, e.g. slimming foods, are prepared by applying a mixture of starch granules, water and a curing agent, such as epichlorohydrin, as a thin film to a heated surface to effect granule rupture. IFT

2

[Measurement of the degree of starch gelatinization.]
Goshima, G.; Ohashi, K.; Tsuge, H.
Research Bulletin of the Faculty of Agriculture, Gifu University [Gifu Daigaku nogakubu Hokoku] No. 40, 79–84 (1977) [19 ref. Ja, en]

A method was devised to measure the gelatinization of starch. The procedure involves selective digestion of gelatinized starch with α-amylase and is followed by detn. of the amount of undigested starch. The undigested starch is determined either by measuring the absorbance of blue colour of the iodine-starch complex, or by measuring blue colour of the undigested starch-anthrone complex in sulphuric acid, after filtration off of the digested low mol. wt. sugars with a sintered-glass filter. The recovery was satisfactory. The newly developed method has the advantage of both rapidity and precision. AS

3

Pectate thickener.
Mars Ltd.
British Patent 1 508 993 (1978) [En]

Solid foodstuffs such as meat or meat by-products are thickened by the incorporation of a pectic substance which has been de-esterified to an average degree of esterification of <20%. IFT

4

[Natural gelling and thickening agents in the food industry.] Natürliche Gelier- und Dickungsmittel in der Lebensmittelindustrie.
Baumann, L.
Kakao und Zucker 29 (9) 245–248, 250–251 (1977) [De]

Aspects considered in this discussion of natural gelling and thickening agents include criteria for selection of the correct agent (food type, desired characteristics of the product, the processing methods used, and the solubility, dispersibility, rheological properties, electrochemical properties, stability, colour, aroma, bacteriological properties etc. of the gelling or thickening agent). Preparation of dispersions and solutions of gelling agents is described, and factors influencing solubility, viscosity and gelation are briefly considered. Characteristics of individual thickening and gelling agents, including starch, pectin, gum arabic, gum ghatti, larch gum, gum tragacanth, gum karaya, locust bean gum, guar gum, carrageenans, furcellaran, agar, alginates, gelatin and caseinates, are described. AJDW

5

Changing carrageenan gel texture by addition of other hydrocolloids. [Lecture]
Christensen, O.; Trudsoe, J.
International Congress of Food Science & Technology - Abstracts p.161 (1978) [En] [Copenhagen Pectin Factory Ltd., DK-4623 Lille Skensved, Denmark]

Consideration is given to the rheological and other properties of gels prepared from: κ-carrageenan; locust bean gum + κ-carrageenan; ι-carrageenan + κ-carrageenan; amidated low methoxyl pectin + locust bean gum + κ-carrageenan; xanthan gum + locust bean gum; and xanthan gum + locust bean gum + κ-carrageenan. [See FSTA (1979) 11 2A60.] JA

6

Proceedings of the Nutrition Society. Abstracts of communications. [Conference proceedings]
United Kingdom, Nutrition Society
Proceedings of the Nutrition Society 37 (2) 27A–45A (1978) [many ref. En]

Abstracts are published of papers presented at the 313th meeting of the Nutrition Society at Harrow, 27 Feb. 1978. The papers presented include: Comparison of the effects of carrageenins and Danish agar on the colon of guinea-pigs, by J. Watt & A. J. Marcus (p. 39A, 1 ref.; both types of substances, used as food additives, caused ulceration of the colon). DIH

7

The use of sodium pectate as a thickener in canned foods.
Mitchell, J.; Sommerville, A.; Speirs, C.
Journal of Food Technology 13 (5) 425–432 (1978) [8 ref. En] [Food Sci. Lab., Dep. of Applied Biochem. & Nutr., Univ. of Nottingham School of Agric., Sutton Bonington, Loughborough, Leics. LE12 5RD, UK]

The thickening properties of sodium alginate, low methoxyl pectin (degree of esterification, 22%) and sodium pectate (degree of esterification, 4%) in systems that had been heat processed were compared with those of starch. Heat penetration data were obtained for pectate and starch solutions processed at 121.1° C in both static and rotating retorts. By controlling the level of Ca release in the solution using a sparingly soluble Ca salt in conjunction with a thermolabile sequestrant, partial gelation of 0.5% sodium pectate solutions could be induced on completion of the heat process cycle giving a high viscosity. This effect could not be obtained using either sodium alginate or the low methoxyl pectin. When low levels of sodium pectate (0.2–0.4%) are mixed with starch, a considerably higher viscosity after processing is obtained compared with starch alone. In a rotating retort a high rate of heat transfer is obtained for the pectate solutions in comparison with solution containing levels of starch required to give comparable post process viscosities. It is suggested that sodium pectate would be of use as a thickener in canned products particularly where rapid heat penetration is desirable. AS

8

[Use of modified starches for improving the quality of prepared foods.] Einsatz von modifizierten Stärken zur Verbesserung der Qualität zubereiteter Nahrungsmittel.

Marschke, H.
Industrielle Obst- und Gemüseverwertung 63 (9) 231-238 (1978) [1 ref. De]

This review discusses the applications of modified starches in food processing in relation to processing technology (HTST sterilization), legal aspects (declaration, limits), structure and properties of native starch, properties and application of modified starches (e.g. production of prepared dishes in the cold), heat transfer during sterilization, and mechanical can-filling of lumpy foods. 3 possible applications of modified starches in can-filling are described, i.e. a low-amylose cold-swelling waxy maize starch (snowflake® 12410) for clear, non-cohesive meat and vegetable dishes; a cold-swelling heat-stable starch (snowflake® 12611) for cold gravy preparation and further addition of non-linked waxy maize starch-bound gravy (snowflake® 06301), or a stable swelling starch (snowflake® 12611) and a non-hydrolysed strongly cross-linked waxy maize starch with delayed swelling (snowflake® 06308) used together to produce a thick gravy for meat and vegetable dishes. RM

9

[Handbook on starch production.] Spravochnik po krakhmalo-patochnomu proizvodstvu. [Book]
Shtyrkova, E. A.; Glubin, M. G.
430 pp. (1978) [Ru] Moscow, USSR; Pishchevaya Promyshlennost'. Price 1.60r

The book, intended for specialists in the starch manufacturing industry, and in plant and equipment design offices, includes the following chapters: Starch and starch products (pp. 4-24); Raw materials for the production of starch (pp. 25-48); Production of starch and starch products (pp. 49-211); Control of the production process (pp. 212-237); Pumps, ventilators and conveyors (pp. 238-265); Materials handling equipment (pp. 266-276); Equipment for production of potato starch (pp. 276-305); Equipment for production of maize starch (pp. 306-351); Equipment for production of feedstuffs and corn oil (pp. 352-360); Equipment for manufacture of modified starches (pp. 395-404); Dextrin and sago production (pp. 405-407); and Automation in the starch industry (pp. 408-421). STI

10

Utilization of citrus waste as a source of pectin in jam making.
El-Mubarak, A.; Bahi El-Din; Magboul, I.; Ali, A. M.
Sudan Journal of Food Science and Technology 9, 55-59 (1977) [15 ref. En] [Food Res. Cent., Shambat, Sudan]

Pectic solutions prepared from lime, orange, and grapefruit waste were examined by detn. of equivalent wt., acetyl content, methoxyl and anhydrogalacturonic acid content. Pectic material was extracted from the peel and used in pumpkin jam making. Using 100 g pectic solution from citrus waste/kg pulp gave good setting and flavour of jam manufactured from pumpkin. AS

11

[Emulsifiers, stabilizers, thickeners and gelling agents.]
Anon.
Industrie Alimentari 17 (7/8) 609-611 (1978) [It]

The text of the modification (29 June, 1978) of EEC directive 74/329 on the title food additives, as published in the Official Gazette NL 197 (22 July, 1978), is reproduced in full. It includes a listing of those for which permission has been granted within the EEC. HBr

12

The interdependence of molecular structure and strength of carrageenan and carrageenan/carob gels. I.
Ainsworth, P. A.; Blanshard, J. M. V.
Lebensmittel-Wissenschaft und -Technologie 11 (5) 279-282 (1978) [21 ref. En] [Food Sci. Lab., Dep. of Applied Biochem. & Nutr., Univ. of Nottingham School of Agric., Sutton Bonington, Loughborough, Leicester, UK]

The molecular composition of carrageenan samples from different sources was investigated using chemical and IR techniques. The purified carrageenan samples produced gels of varying strengths. It was found that the carrageenan samples differed in their chemical composition, the strength of the gel increasing with the level of 3,6-anhydro-D-galactose in the polymer. The observed behaviour accords with the view that these monomer units are present in the region of the polysaccharide chain which is involved in the crosslinks with other carrageenan chains in the gel state.
A synergistic increase in gel strength was observed on adding carob gum to the carrageenan samples. The increase corresponded to the concn. of 3,6-anhydro-D-galactose present in the carrageenan molecules. It is suggested that the regions of carrageenan chains containing this monosaccharide are also involved in crosslinks with the non-branched regions of carob molecules. AS

13

[Pectin jelly.]
Kawai Seiyaku Co. Ltd.
Japanese Examined Patent 5 327 351 (1978) [Ja]

The gel strength of pectin jelly is increased by the addition of Ca salt within a critical concn. range. IFT

14

Present status and prospect of starch utilization in Japan. [Review]
Suzuki, S.
Korean Journal of Food Science and Technology 10 (4) 423-430 (1978) [31 ref. En] [Nat. Food Res. Inst., Min. of Agric. & Forestry, Tokyo, Japan]

Since 1950 there has been a dramatic progress in rationalization of the production of sweet potato and potato starch in Japan. This enabled the dextrose industry using enzymic processes to develop rapidly due to the success of enzymic liquefaction and saccharification. Isomerization of glucose to fructose has been studied, and the immobilization of isomerases prompted its production on an industrial scale in 1970. Another advance is the development of effective methods of producing high purity maltose. A maltohexaose forming amylase was discovered in 1971 and attempts are being made for its pharmaceutical utilization. Saccharification of cellulose by cellulase has been studied. Conversion of starch to other polysaccharides is another example of the numerous Japanese activities. AS

15

Process for the manufacture of yeast glycan.
Robbins, E. A.; Seeley, R. D. (Anheuser-Busch Inc.)
United States Patent 4 122 196 (1978) [En]

A process is described for recovery of a yeast glycan fraction from the insoluble cellular debris fraction obtained from the autolysis of live yeast cells. The glycan obtained can be used as a thickener. IFT

16

Nongelling microcrystalline cellulose offers superior texture to heat sensitive liquid emulsions.
Moore, K.
Food Product Development 12 (6) 38 (1978) [En]

When dispersed in water at 15% concn. Avicel CL-611, a new grade, microcrystalline cellulose, provides a low viscosity, non-gelling, free-flowing stabilizer/thickener for use in heat-sensitive emulsions. Avicel CL-611 enables manufacturers to formulate smoother, creamier, free-flowing liquid products. It may be used for particle suspension, ice crystal control, emulsification, foam stabilization, creaminess, binding, and cling, and as a non-caloric filler in low calorie foods. VJG

17

[Food law assessment of calorie-free and low-calorie ballast and filler substances, thickeners and similar products.] Zur lebensmittelrechtlichen Beurteilung von kalorienfreien und von kalorienarmen Ballast- und Füllstoffen, Dickungsmitteln und ähnlichen Substanzen.
Schulze, H.
Ernährungs-Umschau 24 (3) 77–79 (1977) [De] [Inst. für Hygiene & Tech. der Lebensmittel Tierischen Ursprungs, Univ. München, Fachbereich Tiermed., D-8000 Munich 22, Federal Republic of Germany]

The legal position of inclusion in foods of air, water, and indigestible or poorly digestible carbohydrates, fats and proteins is considered in the light of the current Federal German Food Laws and their latest modifications. Particular attention is given to alginates, carrageenan, pectins, agar, gums (including Arabic, Guar, locust bean) and to unambiguous labelling of food products of reduced calorie content to indicate such additions. The importance is stressed of most recent toxicological and nutritional information in evaluation of admissibility of such products. SKK

18

[Swiss food handbook. Installment 15.] [Book]
Switzerland, Schweizerische Lebensmittelbuchkommission; Switzerland, Eidgenössisches Gesundheitsamt
56pp. (1977) [De] Berne, Switzerland; Drucksachen- & Materialzentrale

This installment of this detailed manual comprises chapter 40, Gelling and thickening agents (pp. 1–52), which includes sections on: classification, nomenclature and uses; analytical methods for detn., identification and evaluation of gelling and thickening agents; and methods for isolation of gelling and thickening agents from various foods. A 2-pp. subject index is included. 2 pp. of amendments to chapter 44, Organic preservatives, are also given. [See FSTA (1976) 8 8A390 for preceding part.] AJDW

19

MCC in food processing applications. Multifunctional Avicel®.
Thomas, W. R.
Gordian 78 (7/8) 224–225 (1978) [En] [FMC Corp., Philadelphia, Pennsylvania, USA]

Microcrystalline cellulose (MCC), a purified form of α-cellulose was developed for use as an inert, insoluble, flavourless and non-metabolizable food ingredient serving as an emulsion, foam and high-temp. stabilizer; a control for moisture migration, ice crystal formation and product flow; a flavour release, texture modifier, hydration aid, micro dispersant and thickener. Two basic types are produced in 3 grades each, for dry or solid applications. MCC has been approved with no restrictions on acceptable daily intake by the FAO/WHO Expert Committee on Food Additives, and is included in Annex 1, Draft E-460 of EEC directive on emulsifiers, stabilizers, thickeners and gelling agents. Main applications include frozen desserts (at 0.3–0.4% by wt.), shredded and grated cheese, and canned foods. RM

20

[Viscosities of carageenan aqueous solutions and physical properties of carageenan-water gels.]
Sawayama, S.; Kawabata, A.; Okabe, M.; Sugi, J.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 52 (9) 409–415 (1978) [20 ref. Ja, en] [Dep. of Nutr., Tokyo Univ. of Agric., Tokyo, Japan]

Viscosities and physical properties of carrageenan-water solutions and gels were compared with those of agar-agar. Viscosity rose with decreasing velocity gradient when measured in a coaxial type rotational viscometer; this is typical of a structural viscosity. Carrageenan solutions showed a concn. dependence of viscosity characteristics of polyelectrolytes. Apparent activation energies calculated from the temp. dependency were 3.79 and 4.94 kcal/mol for a 1% solution of 2 types of carrageenan, compared with 6.16 kcal/mol for agar-agar. Desiccation curves obtained for gels of agar-agar and carrageenan in a microwave oven clearly showed the difference in the water-binding characteristics of the gels. Creep compliance of gels was measured with a parallel plate viscometer, and the data were matched to a rheological model. Elastic moduli and coeff. of viscosity were 10^5–10^6 dyn/cm^2 and 10^7–10^9 poise, resp. Carrageenan showed slightly lower figures than agar-agar gels. Scanning electron microscopy showed a coarse spongy structure for carrageenan, and a closely intertwined fibrous structure for agar-agar. [From En summ.] JRR

21

Agar-agar; direct food substances affirmed as generally recognized as safe (GRAS).
United States of America, Food & Drug Administration
Federal Register 44 (65, April 3) 19389–19391 (1979) [En] [Washington, DC, USA]

Agar-agar is affirmed as GRAS under the Federal Food, Drug, and Cosmetic Act as a direct food ingredient at levels of 0.25–2.0% in bakery products, confections, and other food categories. CAS

22

The effect of heat processing on the structure and rheological properties of carrageenan gels.
Ainsworth, P. A.; Blanshard, J. M. V.
Journal of Food Technology 14 (2) 141–147 (1979) [12 ref. En] [Food Sci. Lab.; Dep. of Applied Biochem. & Nutr., Nottingham Univ., Sutton Bonington, Loughborough LE12 5RD, UK]

Rheological investigations of carrageenan and heat processed carrageenan gels showed that strengths of the gels are greatly reduced on processing whereas very little change takes place in the modulus of rigidity. The results are discussed in terms of the crosslink density and network chains in the gels, and these indicate that the rigidity modulus appears to be strongly dependent on crosslink density whereas gel strength, as well as being influenced by crosslink density, is also dependent on the gel network chains. AS

23

Xanthan gum, a biosynthetic polysaccharide for the food industry.
Betz, D. A.
Food Technology in Australia 31 (1) 11–16 (1979) [11 ref. En] [Kelco, Div. of Merck & Co. Inc., 8355 Aero Drive, San Diego, California 92123, USA]

Development, commercial production, regulatory status, structure, properties and uses of xanthan gum are described. VJG

24

New products from seaweed.
Attiyate, Y.
Food Engineering International 4 (6) 23–24 (1979) [En]

Properties of carrageenans, and fractions of carrageenans (κ, λ, and ι) are briefly surveyed and applications are discussed with special reference to Flanogen ELA, a stabilizer suitable for use at acid pH made by Satia, the Seaweeds and Colloids Division of Ceca SA, France. Acid fruit-flavoured gelled dairy desserts may be produced incorporating 0.4% carrageenan as gelling agent, which also stabilizes the milk against coagulation. Carrageenans can be dissolved at 60–65°C, and resulting gels are stable to UHT treatment. Other applications mentioned include low-calorie and dietetic foods, water jellies, sauces and dressings, confectionery creams and meat and fish slices in jelly. DIH

25

Carrageenan-based gelling agent offers cost, functional advantages.
Moore, K. K.
Food Product Development 13 (2) 44 (1979) [En]

Gelloid IWG, a product composed of carrageenan and locust bean gum standardized with dextrose and dipotassium phosphate, has been developed by Marine Colloids Division of FMC Corporation, of Springfield, New Jersey, USA. Typical applications include dry gelatin mixes, both retail and institutional products where it is used at levels of approx. 0.6–0.7% of the finished gel. Cost savings can be ≥ 50% depending on the type of gelatin it replaces. Gelloid IWG does not melt at room temp., making products with this ingredient more versatile in terms of serving temp. and transportation. Other characteristics of water gels formed with Gelloid IWG include: no excessive syneresis on standing; good clarity, flavour release, and texture; good ability to maintain fruits in suspension, and the ability to withstand the rigors of shipping without fracturing. VJG

26

Suppliers of gums and gum-like ingredients.
Anon.
Food Product Development 13 (2) 32–33 (1979) [En]

An alphabetical list of 30 US suppliers of the following products is presented: xanthan, tragacanth, tara, pectins, microcrystalline cellulose, methyl cellulose and hydroxypropylmethylcellulose, locust bean, karaya, guar, ghatti, furcellaran, carrageenan, carboxymethylcellulose, hydroxypropylcellulose, arabic, alginates and agar. VJG

27

Basic guidelines for food gum selection.
Anon.
Food Product Development 13 (2) 21–24, 26, 28 (1979) [En]

A summary of the properties and uses of the major gum types is provided under the following headings: seaweed extracts (agar, alginates, carrageenan, furcellaran); plant exudates (gum acacia, gum tragacanth, gum ghatti and gum karaya); seed gums (locust bean gum, guar gum); plant extracts (pectin); and cellulose derivatives (carboxymethylcellulose, methylcellulose and hydroxypropylmethylcellulose). VJG

28

Xanthan gum, a unique bacterial polysaccharide for food applications.
Cottrell, I. W.; Kang, K. S.
Developments in Industrial Microbiology **19**, 117–131 (1978) [17 ref. En] [Kelco Div., Merck & Co. Inc., 8225 Aero Drive, San Diego, California 92123, USA]

Xanthan gum is manufactured by the aerobic submerged fermentation of Xanthomonas campestris, employing as C sources glucose or related substances. It is isolated from the fermentation liquor by precipitation with isopropyl alcohol. Xanthan gum is the first bacterial heteropolysaccharide used widely in the food industry. Its successful development is due to its unique properties as a hydrocolloid. It is characterized by high viscosity, a high degree of pseudoplasticity, excellent heat and pH stability, and good compatibility with a variety of salts. Due to its particular structure it reacts with galactomannans (locust bean gum, guar gum) to form a gel or produce a synergistic increase in viscosity. Together with good solubility and suspending properties this has ensured its acceptance by the food industry as a multipurpose stabilizer, thickener and processing aid. Its early use as a salad dressing stabilizer has been followed by successful applications in sauces, bakery fillings, dairy products, frozen and canned products, and liquid suspensions. AS

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AB 42

HICKENERS AND GELLING AGENTS

SELECTED FROM VOLUME 12
FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Gesellschaft fur Information und Dokumentation, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen.

INTRODUCTION

Food Annotated Bibliographies (FABs) are collections of abstracts on specific topics in food science and technology. The topics are chosen by the staff of the International Food Information Service as being of particular interest or importance. The topics normally interest individual workers, who may not require the full information provided in Food Science and Technology Abstracts, from which the abstracts for FABs are taken. The size and the cost of the FABs are controlled as much as possible with the interests of individual workers in mind.

Titles of the FABs now available are given on the back cover of this booklet. For up-to-date lists of FABs or suggestions for new topics please write to the address on the back cover. New subjects are searched for at least the five most recent volumes of Food Science and Technology Abstracts. Thereafter each FAB is updated monthly. Copies of each months abstracts on any topic may be obtained as indicated on the back cover of this publication. At the end of each volume of up-dating, the abstracts are merged and made available as a separate supplement to the original FAB.

Some of the larger FABs have been divided into sections to facilitate use. FAB 47 also has a subject and author index provided.

Copies of all original articles referred to in the abstracts may be bought (or occasionally borrowed) from the International Food Information Service. A form for ordering these is provided at the end of this FAB.

Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES
EDITOR

1

Cecal response to different molecular weights and types of carrageenan in the guinea pig.
Engster, M.; Abraham, R.
Toxicology and Applied Pharmacology 38 (2) 265–282 (1976) [16 ref. En] [Cent. of Exp. Path. & Toxicology, Albany Med. Coll. Albany, New York 12208, USA]

Native, undegraded food-grade carrageenan has a high mol. wt. (200 000) and consists of 70:30 kappa (κ) and lambda (λ) carrageenan chains; it has been shown to have no adverse effects on guinea pigs, rats, monkeys or pigs and is not stored in body organs. The new, different low mol. wt. (5000) form of carrageenan (C16) from the seaweed Eucheuma spinosum comprises iota chains and has been reported to induce caecal and colonic ulceration in experimental animals. All 3 chain types can be hydrolysed to low mol. wt. fractions and such degradation may possibly occur during food processing. Safety evaluation of different mol. wt. and chain types was undertaken by giving guinea pigs 7 mol. wt. iota fractions, 3 κ and 3 λ fractions as 1% solutions in drinking water for 2 wk, plus 6 of the iota fractions as 2% of the diet for 10 wk. Histopathological changes are described and illustrated. No effects were observed with the κ and λ fractions. The highest and lowest mol. wt. iota fractions were neither absorbed nor stored and had no histopathological effects, but the others produced epithelial thinning or caecum ulceration; none of the iota fractions produced any response when given in the diet. It is concluded that adverse effects on the guinea pig occur only within a limited mol. wt. range of the iota chain type when given in drinking water. ELC

2

Carrageenan, salts of carrageenan, and chondrus extract (carrageenin); withdrawal of proposal and termination of rulemaking proceeding.
United States of America, Food & Drug Administration
Federal Register 44 (133, July 10) 40343–40345 (1979) [En] [Washington, DC, USA]

Current information indicates a tentative no-observed-effect level of 0.5% carrageenan in the diet of rats. No appreciable risk to the public health will occur with the continued use of carrageenan in accordance with existing regulations while analysis and evaluation of available and anticipated scientific data are being carried out. CAS

3

[Starch thickener.]
Matsuya Kagaku Kogyo Co. Ltd.; Nikken Kagaku Co. Ltd.
Japanese Examined Patent 5 412 544 (1979) [Ja]

A starch thickener is prepared by α-amylase hydrolysis of starch, followed by swelling, dispersion, further hydrolysis and hydrogenation. IFT

4

[Food additives]
Anon.
Alimentaria No. 103, 65, 67, 69, 71 (1979) [Es]

Max. concn. permitted by Spanish legislation in a wide range of foods are tabulated for the following thickeners and agglutinants: alginic acid; ammonium, sodium, potassium, calcium and propylene glycol alginates; agar-agar; carrageenan; carboxymethylcellulose; pectins; gums (arabic, guar, tragacanth, carob, khaya); caseinates; gelatine; starch; dextrins; and microcrystalline cellulose. HBr

5

The effect of shear rate on the viscosity of solutions of sodium carboxymethylcellulose and κ-carrageenan.
Elfak, A. M.; Pass, G.; Phillips, G. O.
Journal of the Science of Food and Agriculture 30 (7) 724–730 (1979) [19 ref. En] [Dep. of Chem. & Applied Chem., Univ. of Salford, Salford M5 4WT, UK]

The apparent viscosities of aqueous solutions of sodium carboxymethylcellulose (NaCMC) and κ-carrageenan were measured over a range of shear rates from 14 to 1142 s^{-1}. Comparable measurements were also made on gum solutions to which glucose, sucrose, or glucose syrup had been added. For all the solutions the variation of relative viscosity with shear rate fits a power law equation. Addition of sugars to the most conc. solutions of NaCMC has no effect on the non-Newtonian behaviour but addition of glucose syrup to the most dilute solutions of NaCMC decreased the non-Newtonian behaviour. However, the general pattern of behaviour showed close similarity with that of guar gum and locust bean gum. In the more conc. glucose and sucrose solutions the non-Newtonian behaviour of κ-carrageenan was increased appreciably. There was no comparable effect on κ-carrageenan in glucose syrup solutions. This different behaviour of κ-carrageenan is attributed to the development of solute-solute interactions. AS

6

[Utilization of agar. XVI. Effect of food additives and natural polymer substances of agar gel.]
Fuse, T.; Yamaguchi, N.
Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 25 (5) 268–274 (1978) [8 ref. Ja, en] [Food Res. Inst., Aichi Prefectural Gov., Shinpukuji-cho 2-1, Nishi-ku, Nagoya, Japan]

The effects of various food additives and natural polymers on liquefying point (l.p.), gel strength, modulus of elasticity and brittleness of agar gel were investigated. The l.p. of 0.01–1.0% agar increased with increase in contents of several salts (e.g. ammonium and sodium sulphate) and some polysaccharides (e.g. locust bean and guar gums). Addition of sodium sulphate, monosodium L-aspartate and magnesium chloride resulted in a rise of gel strength. It may be assumed that the additives increased the agar's solubility. Addition of substances which increase gel strength generally reduced the modulus of elasticity and brittleness of the agar gel. AS

7

The effect of casein on the viscosity of solutions of hydrocolloids.
Elfak, A. M.; Pass, G.; Phillips, G. O.

Journal of the Science of Food and Agriculture 30 (10) 994–998 (1979) [17 ref. En] [Dep. of Chem. & Applied Chem., Univ. of Salford, Salford M5 4WT, UK]

Apparent viscosities of aqueous solutions of guar gum, locust bean gum, sodium carboxymethylcellulose and κ-carrageenan have been measured over a range of shear rates from 14 to 1142 s^{-1}. Comparable measurements were made on solutions to which different quantities of casein (10–40 g/l) had been added. For all the solutions a power law equation describes the variation of relative viscosity with shear rate. Addition of casein has no effect on solutions of guar and locust bean gum, but does affect rheology of solutions of sodium carboxymethylcellulose and κ-carrageenan. Behaviour of κ-carrageenan indicates a dependence on the polyanion:casein ratio, reaching a max. at a concn. ratio of 1:4. The only significant solute-solute interactions in the hydrocolloid-casein solutions are electrostatic in nature. AS

8

[Rheological properties of the calcium alginate-potato starch hydrolysate-water system.] Rheologische Eigenschaften des Systems Calciumalginat-Kartoffelstärkehydrolysat-Wasser.

Tschimirov, J. I. [Chimirov, Yu. I.]; Kislova, T. V.; Brundo, E. E.; Schierbaum[Shirbaum], F. R.; Straschnenko[Strashnenko], E. S.; Tolstoguzov, V. B.; Augustat, S.

Nahrung 23 (5) 503–510 (1979) [17 ref. De, en, ru] [Inst. for Primary Organic Compounds, Moscow, USSR]

The rheological properties of liquid solutions and gels of sodium alginate, calcium gluconate and gelling maltodextrin were investigated and compared with the behaviour of pastes and gels of non-degraded potato starch. The dependence of the rheological properties upon the calcium gluconate concn. is extreme. A marked increase in the viscosity of the liquid solutions and max. values for the hardness and breaking strength of the gels are obtained at a calcium gluconate/sodium alginate ratio of 0.3. Breaking strength, elasticity and hardness of the maltodextrin-based gels are many times inferior to those of potato starch-based gels. The breaking strength, hardness and elasticity of maltodextrin gels are increased by the addition of sodium alginate and calcium gluconate, which increases their effectiveness when used in foods. IN

9

Water binding properties of macromolecular systems.

Busk, G. C., Jr.

Dissertation Abstracts International, B 39 (12) 5821: Order no. 79-11982, 251 pp. (1979) [En] [Univ. of Minnesota, Minneapolis, Minnesota 55455, USA]

Studies on gelation of gelatin, carrageenan and agar are described. The interaction between these polymers and water was investigated on the basis of studies on: suction pressure created by capillaries; vapour pressure depression effects; NMR characteristics; water binding at low moisture contents, evaluated by adsorption and desorption isotherms; gel viscosity measured by a shear resistance method; and rate of diffusion of a large molecule in the gel systems. The results show that the water-structuring effects of these polymers in solution may be attributed to hydrogen bonding, hydrophobic bonding and ionic bonding. Postulated long-range forces and water multilayers are unnecessary. The experimental data gave an excellent fit to the Florey-Huggins theories of macromolecular solutions. AJDW

10

[Gelling, thickening, binding and emulsifying agents in milk products.] Gelier-, Verdickungs-, Binde- und Emulgiermittel in Milchprodukten.

Kurmann, J. A.

Schweizerische Milchzeitung 105 (63) 431–432; (64) 433–434 (1979) [13 ref. De] [Landwirtschaftliches Inst. Grangeneuve, 1725 Grangeneuve, Switzerland]

This review-type lecture, presented at a Seminar in Zollikofen (Switzerland) during 31 May–21 June 1979, deals with the general problem of food additives; and with gelling, thickening, binding and emulsifying agents in milk products, the definition of hydrocolloid, classification of hydrocolloids, emulsifiers, main effects of hydrocolloids on milk products, influence on taste and colour, nutritional aspects, and toxicological aspects being considered. 10 tables of data are included. SKK

11

[Legal aspects of use of alginic acid and alginates as additives.] Lebensmittelrechtliche Beurteilung des Zusatzes von Alginsäure und Alginaten.

Schmidt, E. K. H.

Gordian 79 (2) 28, 30, 32, 34 (1979) [De]

Addition of alginic acid and alginates to dietary foods, milk products, cheese, ice cream, chewing gum, essences and colours, fruit products, tobacco products and food wrapping materials are discussed with reference to Federal German regulations. RM

12

Dextrin incorporates high-fat foods into flavorful, free-flowing powders.

Anon.

Food Product Development 13 (6) 40 (1979) [En]

N-Zorbit^R, primarily designed as a bulking agent, is available from National Starch and Chemical Corporation. It is obtained by the standard process of deriving dextrins from tapioca, has a very low bulk density, about 5 lb/ft^3 or 1/10 the average density of starches or dextrins. High-oil or high-fat foods may be successfully ground with this tapioca dextrin on conventional mills to produce free flowing powders with the full flavour of the original food. The non-aqueous liquids which have been absorbed are immediately released when N-Zorbit comes into contact with water. Like most low-bulk-density powders, N-Zorbit is suited for use as a bulking agent for concentrated active ingredients such as artificial sweeteners, spice blends, and colour blends. Potential product applications include powdered peanuts, almonds, pecans, peanut butter, chocolate liquor, flavour oils and vitamins. These products, in turn, can be used to develop peanut butter puddings and ice creams, nutty snacks and new flavoured cookies and confections. VJG

13

[Galactomannans from Leguminosae in foods.] [Review]
Courtois, J.-E.
Annales de la Nutrition et de l'Alimentation **33 (2) 189-198 (1979)** [many ref. Fr] [Fac. des Sci. Pharmaceutiques et Biol., 4, Avenue Observatoire, 75016 Paris, France]

This review discusses the distribution and structure of galactomannans, the action of enzymes (i.e. α-galactosidase, β-mannanase, β-mannosidase and galactose oxidase), and their digestion by ruminants and man. Their main food uses are as carob and guar gums, and a recent product Tara gum (from *Caesalpinia spinosa).* RM

14

[Chemical and physiological properties of thickening and gelling additives.] [Review]
Adrian, J.; Assoumani, M.
Revue Francaise de Dietetique 23 (88) 3-9, 11-25 (1979) [244 ref. Fr]

The extensive literature relating to the use of hydrocolloid textural agents in food technology is reviewed, with reference to the chemical composition of vegetable gums and colloids (pectins, alginates, carrageenan, agar, gum arabic, carob and guar gums, furcellaran, karaya gum and xanthans), and their physical properties, including dispersion and viscosity, and gelling behaviour. Discussion of the physiological impact of these materials includes mention of their toxicity and digestibility, their role in regulation of intestinal function and medical uses. A section is devoted to the effects of hydrocolloids in the diet on the utilisation of other food components, particularly nitrogenous substances, lipids and minerals. JRR

15

[Textural characterization of Curdlan 13140-starch gel.]
Ishida, K.; Shiga, I.; Yokoo, Y.
Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 25 (12) 673-676 (1978) [5 ref. Ja, en] [Food Res. Inst., Aichi Prefecture, 2-1 Shinpukuji-cho, Nishi-ku, Nagoya-shi, Japan]

The textural properties of Curdlan 13140 (PS)-starch gels were investigated, using a Rheometer. The gel was prepared by heating an aqueous suspension of PS, starch and sucrose at 100°C for 1 h. The gel formulated with 2% PS, 8% starch and 20% sucrose showed little syneresis, though a gel prepared with PS alone showed considerable syneresis. The gel strengths of PS-starch gels were lower than those of gels without starch. Waxy corn starch was generally used, with respect to stability of the product. The gel strength of PS-starch gel was increased by increasing the concn. of PS and by extension of the heating time, and was decreased by increasing starch concn. within the range 0-20%. The textural properties of the PS-starch gel were intermediate between those of PS and starch gels. The gel strength of PS-starch gel increased with addition of sucrose at concn. <15%. AS

16

Psychophysical studies on liquid foods and gels. (In *'Food texture and rheology'* [see FSTA (1980) 12 7A447].) [Lecture]
Wood, F. W.
pp. 21-31 (1979) [15 ref. En] [Unilever Res., Colworth Lab., Unilever Ltd., Colworth House, Sharnbrook, Bedford MK44 1LQ, UK]

The psychophysics of foods has not as yet been widely studied; psychophysics is defined as the study of the quantitative relationship between stimulus and sensation. Major landmarks in the history of psychophysics research are reviewed, and consideration is then given to 2 studies. The 1st involved examination of the variation of perceived sweetness with perceived thickness in 40% sucrose solutions thickened with xanthan gum, guar gum or sodium carboxymethyl cellulose (SCC) to give a range of viscosities and flow characteristics. Results indicated that, for a given perceived thickness, solutions containing guar gum are less sweet than those containing SCC which, in turn (particularly at higher viscosities), are perceived to be less sweet than those containing xanthan gum; solutions containing xanthan gum were the most pseudoplastic and those containing guar gum the least pseudoplastic. The 2nd study involved psychophysical experiments with 7 gels, 3 based on agar, 3 on 1:2 mixtures of xanthan gum:locust bean gum, and 1 on a xanthan gum:locust bean gum mixture also containing κ-carrageenan. The experiments included measurement of the Bloom number with a gelometer and of max. yield force, max. strain and initial stress/strain slope with an Instron Universal Testing Machine, and scaling of perceived strengths by the method of cross-modality matching. Studies of the correlations between cross modal scaling and physical measurements indicated correlation coeff. of 0.95 between mouth gel strength and max. yield force, 0.89 between shakeability (wobble) and stress/strain slope, 0.86 between touch hardness and Bloom number, and 0.84 between decreasing mouth brittleness and max. strain. JA

17

On the nature of the relationship between the structure and rheology of food gels. (In *'Food texture and rheology'* [see FSTA (1980) 12 7A447].) [Lecture]
Mitchell, J. R.; Blanshard, J. M. V.
pp. 425-435 (1979) [16 ref. En] [Dep. of Applied Biochem. & Nutr., Univ. of Nottingham, Sutton Bonington, Loughborough, Leics, UK]

The relationship between the structure and rheological properties of gels was examined with particular reference to alginate and pectate systems. The Helmholtz free energy of network chains of varying degrees of polymerization was calculated as a function of the end-to-end distance for polygalacturonic acid (the major constituent of pectin) and for polymannuronic and polyguluronic acids (the constituent polymers of alginic acid). The change in free energy with end-to-end distance was calculated by the method of Bailey et al. [see *Colloid and Polymer Science* (1977) 255, 856]; the procedure involved in evaluating the distribution function of end-to-end lengths is detailed. Results indicated that the shortest network chains in alginate and pectate gels are very stiff and extended but that these gels also contain longer, more flexible chains. On the basis of these results, it is suggested that the rigidity modulus is influenced primarily by the short, stiff chains and that the rupture strength is governed by the number of long, flexible chains remaining after the crosslinks joined by the short, stiff chains have ruptured; this may explain why the rigidity modulus of gels is independent of mol. wt. above a certain critical value, whereas rupture strength appears to be strongly dependent on mol. wt. To test this theory compression tests were performed with an Instron machine on cylinders of carrageenan and alginate gels whose mol. wt. had been reduced by autoclaving. Comparison of non-autoclaved (control) and autoclaved gels indicated that a reduction in mol. wt. resulted in reduced rupture strength but did not affect the elastic modulus. JA

18

Oral perception of solution viscosity.
Christensen, C. M.
Journal of Texture Studies 10 (2) 153-164 (1979) [11 ref. En] [Monell Chem. Senses Cent., 3500 Market Street, Philadelphia, Pennsylvania 19104, USA]

Oral assessments of the viscosity of aqueous solutions thickened with sodium carboxymethylcellulose (CMC) were made using magnitude estimation. In one experiment, subjects judged the viscosity of low (L), medium (M) and high (H) viscosity forms of CMC. CMC-H solutions were perceived to be significantly thinner than CMC-L or CMC-M solutions at equivalent physical viscosities. The data suggest that perceived viscosity is determined by averaging viscosity values over a range of shear rates. In another experiment, extreme care was taken to eliminate the possibility of non-oral cues in the perceptual assessment of solution viscosity. Subjects judged aquoous solutions thickened with CMC-M. An exponent of 0.29 characterized the power function relating physical and orally perceived viscosity. AS

19

Aseptic canning process keys shelf-stable custard line.
Ranieri, S.
Food Product Development 13 (11) 32, 39 (1979) [En]

A description is given of the manufacture of the aseptically packaged 'Thank you' brand of egg custard by Michigan Fruit Canners'. The product is made with fresh egg yolks and thickened with carrageenan, xanthan gum, and locust bean gum. Other ingredients are skim milk, water, partially hydrogenated soybean oil, mono- and diglycerides, disodium phosphate, salt, artificial flavouring and riboflavin and annatto colour. Key considerations in developing an acceptable egg custard include pretreating the egg yolks to avoid curdling and utilizing the steam infusion cooking system. The line is to be extended by the introduction of 4 new flavour var. VJG

20

[Contribution to starch rheometry.]
Kodet, J.; Sterba, S.
Mlynsko-Pekarensky Prumysl 25 (12) 369-372 (1979) [6 ref. Cs] [Skrobarny, Oborovy Podnik Havlickuv Brod, Czechoslovakia]

Rheometric measurements are essential for assessing starch dispersion properties; some data on practical rheometry are generalized. Preparation of the sample is vital for measuring flow curves; the factors involved are the thermal processing pattern, scheduling of operations, and mechanical load. These are also involved in measuring the data from a rotary rheometer, and affect data reproducibility. The problem of thixotropy is also discussed in connection with preparation and measurements. The rheology of starch dispersions is described, comprising Newtonian, pseudo-plastic, and visco-elastic liquids, gels and solid substances. Methods of calculating rheological parameters using the least squares technique are discussed and data of actual rheological measurements on a native potato starch are provided for reference. STI

21

[Gel permeation chromatography to detect gelation agents and thickeners.]
Gelpermeationschromatographie zum Nachweis von Gelier- und Verdickungsmitteln.
Hunziker, H. R.; Miserez, A.
Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene 71 (1) 87-94 (1980) [3 ref. De, fr, en] [Bundesamt für Gesundheitswesen Abteilung Lebensmittelkontrolle, CH-3008, Bern, Switzerland]

HPLC on a gel permeation column in series with a refractive index (RI) detector was used for quantitative detn. of thickening agents. 15 different agents (agar, alginate, carrageenan, guar gum, gum arabic, carob bean gum, karaya gum, pectin, propylene glycol alginate, Tara gum, gum tragacanth, oxidized guar gum, carboxymethylcellulose (CMC), xanthan gum, tamarind kernel powder) from different sources were purified and chromatographed as 0.04% solutions. The peak areas of the gelation agents examined were directly proportional to the concn. in the range 10-50 mg/100 ml. Measured individual values for the peak areas are distributed normally with a relative deviation range $T (T = s.t)$ of ±21.6% at $P = 95\%$. The confidence limit of the mean value is ±1.6% (relative). CMC is a good standard. Methylcellulose and analogous cellulose ethers do not give peaks with the experimental conditions used (μ-Bondagel column E-125, 1 ml/min 0.05M NaH_2PO_4, RI-detector $x = 1 \times 10^{-5}$, 20 μg thickening agent/50 μl loop-injection). Possibilities of quantitative isolation of gelation agents from foodstuffs are discussed. AS

22

Low calorie bulking agents. [Review]
Beereboom, J. J.
CRC Critical Reviews in Food Science and Nutrition 11 (4) 401-413 (1979) [66 ref. En] [Cent. Res., Pfizer Inc., Groton, Connecticut, USA]

Obesity, a common disorder causing excess mortality due to the development of cardiovascular disease, hypertension, respiratory illness, and diabetes, is difficult to control by simple dieting techniques. Low calorie foods, which can facilitate newer wt. reduction approaches such as behaviour modification, often lack adequate palatability due to the absence of carbohydrate or fat. Various low calorie bulking agents that can replace the traditionally used carbohydrates and fats are discussed in terms of caloric value, utility, and regulatory status. Methods of measuring caloric utilization of bulking agents in test animals and humans are evaluated. For fat, no really satisfactory replacement is currently available, although several promising products are under development. Dietary fibre sources such as microcrystalline cellulose are receiving considerable attention as flour replacements. While the polyols have many desirable attributes, as sucrose replacements, their caloric utilization values generally prevent a significant caloric reduction when they are used in foods. Several experimental sucrose replacements are described. AS

23

Foodstuffs containing crosslinked starches using STMP.

Rubens, R. W. (National Starch & Chemical Corp.)
United States Patent 4 183 969 (1980) [En]

The invention discloses a dual derivatizing process for the preparation of cold water swelling starches and foods thickened therewith. The starch base is first subjected to a primary crosslinking reaction using sodium trimetaphosphate (STMP) according to conventional techniques, then reslurried, treated with additional STMP and drum dried to effect a secondary cross-linking reaction in situ. AS

24

Direct acidified yogurt.

Igoe, R. S. (Merck & Co. Inc.)
United States Patent 4 169 854 (1979) [En]

A direct acidified yoghurt is prepared by mixing 1.8–4.5 parts (by wt.) of thickener blend with 80–98 parts milk and optionally up to 18 parts sweetener, pasteurizing the mixture, adding 0.5–1.2 parts acidulant (e.g. citric or lactic acids) and homogenizing this mixture. A typical thickener blend consists of 64.3% waxy maize starch, 28.6% carboxymethyl cellulose, 5.7% xanthan gum and 1.4% locust gum. EJM

25

Furcellaran gel creep study.

Plascina, I. G.; Fiskina, N. A.; Braudo, E. E.; Tolstoguzov, V. B.
Nahrung 24 (6) 543–550 (1980) [16 ref. En, de, ru] [Inst. of Primary Organic Compounds, Acad. of Sci., Moscow, USSR]

Creep characteristics of furcellaran gels (0.5–2.0% DM content) were evaluated at 25–50°C in the region of linear viscoelasticity. Under conditions of reversible deformation, the shear modulus increased with increasing temp. Irreversible deformation of the gels was observed over the temp. range studied. Dependence of max. Newtonian viscosity on temp. was characterized by the Gusman-Arrhenius equation. Apparent activation energy of viscous flow of a 1.5% DM gel was 63 ± 5 kJ/mol. The enthalpy of breakdown of the gel structure is low (18–25 kJ/mol). Dependence of Newtonian viscosity on furcellaran concn. is also considered. IN

26

The influence of solvent viscosity on the threshold values of primary tastes.

Paulus, K.; Haas, E.-M.
Chemical Senses 5 (1) 23–32 (1980) [11 ref. En] [Federal Res. Cent. for Nutr., D-75 Karlsruhe, Federal Republic of Germany]

To study the effect of viscosity on the stimulus and recognition thresholds of the 4 primary tastes, 4 thickeners which are relatively free of any specific taste and odour (methyl cellulose, guar seed flour, carob seed flour and tara seed flour) were selected from a greater number of such substances available and the stimulus and recognition thresholds at the 4 viscosity levels, 1, 10, 100 and 1000 cP determined for sucrose, sodium chloride, caffeine and citric acid. It was found that with increasing viscosity also the stimulus and recognition thresholds increased which means that higher concn. of the taste substances are necessary to produce the same taste intensity at higher viscosity. Significant differences were found particularly at the highest viscosity level of 1000 cP as compared to 1 cP. By relating the individual values to the corresponding value at 1 cP it is possible to determine, by means of the so-called amplification factors, the concn. increase that is necessary to produce the same taste intensity as at 1 cP. On the basis of regression straight lines, this amplification factor can be determined for all substances and taste qualities. It became obvious in this way that not only viscosity is important but also the kind of thickener used. AS

27

[Gelled food.]

San Ei Chemical Industry Co. Ltd.
Japanese Examined Patent 5 444 740 (1979) [Ja]

Carrageenan gelling agents are described containing 1-carrageenan and a specified Ca salt. The composition dissolves in cold water and gels quickly, eliminating the need for heating and cooling processes. IFT

28

Effects of calcium and sodium carrageenans and ι-carrageenan on hamster foetal development.

Collins, T. F. X.; Black, T. N.; Prew, J. H.
Food and Cosmetics Toxicology 17 (5) 443–449 (1979) [11 ref. En] [Div. of Toxicol., FDA, Dep. of Health, Education & Welfare, Washington, DC 20204, USA]

Studies were carried out into the foetal effects of calcium κλ-carrageenan and sodium κλ-carrageenan (both used in food) and of ι-carrageenan (C-16) (not permitted in food in the USA but used as an antipeptic agent in some European countries) in Syrian hamsters. No dose-related teratogenic or foetotoxic effects occurred with any of the 3 compounds tested when 10, 40, 100 and 200 mg/kg were given by oral intubation on days 6–10 of gestation. VJG

29

Exocellular, microbial polysaccharides. [Review]
Sandford, P. A.
Advances in Carbohydrate Chemistry and Biochemistry 36, 265–313 (1979) [435 ref. En] [N. Reg. Res. Cent., USDA, Peoria, Illinois 61604, USA]

Production and properties of microbial polysaccharides, many of which have applications as gums or gelling agents in foods, are reviewed in detail. Polysaccharides of particular interest to the food industry which are considered individually include the following acidic polysaccharides: xanthan gum from *Xanthomonas campestris,* alginate from *Azotobacter vinelandii* and polysaccharides from *Arthrobacter* spp.; and neutral polysaccharides, scleroglucan from *Sclerotium glucanicum,* curdlan from *Alcaligenes faecalis* var. *myxogenes,* and pullulan. DIH

30

[Analytical determination of polysaccharide thickening agents for foods – a review.] Analytik der als Lebensmittelzusatzstoffe verwendeten Polysaccharide.
Scherz, H.; Mergenthaler, E.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 170 (4) 280–286 (1980) [14 ref. De, en] [Inst. für Lebensmittelchem., Univ. Münster, Piusallee 7, D-4400 Münster, Federal Republic of Germany]

The analytical methodology, as developed by the authors for polysaccharides used as thickening agents in foods, is reviewed and summarized. Present additive regulations increase topicality and need for this subject. Analytical methodology consists of the following steps: isolation of the polysaccharides from food samples; purification of the polysaccharide; detn. of monomeric compounds by TLC or by GLC, separation into neutral and acid compounds by ion exchange chromatography on DEAE-cellulose; and detn. of the types of linkages between monomeric compounds by permethylation. AS

31

[Determination of some thickeners in dairy products.] Quantitative Bestimmung einiger Dickungsmittel in Milchprodukten.
Glück, U.; Thier, H. P.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 170 (4) 272–279 (1980) [14 ref. De, en] [Inst. für Lebensmittelchem., Univ. Münster, Piusallee 7, D-4400 Münster, Federal Republic of Germany]

A method for rapid determination of thickeners is described, based on the following steps: removal of fat with dioxane; enzymic hydrolysis of starch; precipitation of protein with trichloroacetic acid; precipitation of polysaccharides in 80% ethanol (2 h); hydrolysis in trichloroacetic acid (0.5 mol/l) for 4 h at 100°C; conversion of the resultant monosaccharides to aldonitryl acetates; and gas chromatography on Chromosorb W, AW-DMCS, 60–80 mesh, with N_2 as carrier gas, and with a flame ionization detector. The various steps can be combined in different ways, depending on the composition of the dairy product tested. Test samples should contain ≥5 mg thickener, the min. amount needed for gas-chromatographic determination of the component sugars. Several variants of the method were tested on mixtures of dried skim or whole milk, starch and sucrose, containing 1–2% thickener. Recoveries for 9 thickeners were: carob bean, 82–92%; guar, 84–95%; arabinogalactan, 73–82%; carrageenans, 78–83%; furcellaran, 89%; agar, 62%; gum arabic, 70–82%; tragacanth, 74–89%; and xanthan, 65–88%. Reproducibility was good (coeff. of variation 5–10%). In most cases the quantity of thickener was calculated from the particular sugar which was the largest single component in the polysaccharide. For commercial thickeners based on carob bean or guar, however, where the ratio of mannose to galactose may vary, the calculation has to be based on the average value for both these sugars: content of carob bean in a commercial sample of vanilla ice cream, for example, was calculated to be 0.24%, based on a result of 0.21% for mannose and 0.27% for galactose. ADL

32

[Analytical control of food additives.]
Sudraud, G.
Annales des Falsifications et de l'Expertise Chimique 72 (774) 233–235 (1979) [Fr] [Lab. Central de la Repression des Fraudes & du Controle de la Qualite, 25, Avenue de la Republique, 91305 Massy, France]

Current practice in the supervision of food additives by the Central Laboratory of the Fraud Prevention and Quality Control Service at Massy, France, is surveyed. The identification of acid and volatile preservatives by steam removal and IR spectrophotometry is described. Aroma substances, being of considerable chemical complexity and present in minute quantities in finished products, must be checked in their pure state; gas phase chromatography and isotopic examination have been used both on pods and essences to distinguish synthetic and natural vanilla. In earlier studies natural constituents of aroma substances were identified by TLC, particular success being obtained in identifying piperonal. Thickeners are examined using enzymic hydrolysis; another method involves colorimetry and gas phase chromatography. Problems in analysing emulsifiers are as yet unsolved, but research using high performance liquid chromatography is in progress. Particular attention is paid to additives in pork butchery, determining nitrates, nitrites, polyphosphates and sugars by Technicon chain. Strict observation of regulations appertaining to colorants is ensured by current official methods. KME

33

[Starch-containing dry food product.] Stärkehaltiges Lebensmitteltrockenprodukt.
Bohrmann, H.; Campbell, T.; Grigoteit, W.; Müller, G. (Maizena GmbH)
German Federal Republic Patent Application 2 930 664 (1980) [De]

A thickening additive for broths and gravies is prepared from a starch which has a delayed thickening action of ≥5 s and possibly 5 min at b.p. before the thickening takes effect. The starch is prepared by heating starch from roots or tubers, e.g. native potato starch, tapioca or arrowroot, having approx. 20%

moisture content in an enclosed vessel at 90-120°C. W&Co

34

[National Food Administration Ordinance amending the Ordinance on Food Additives.]
Sweden, Statens Livsmedelsverk
Statens Livsmedelsverks Författningssamling SLV FS:2 1p. (1980) [Sv, en]

This Ordinance amending Ordinance SLV 1975:11 covers the following changes: addition of paprika oleoresin to the list of colorants approved for use in mayonnaise and salad dressings; and addition of xanthan gum to the list of thickeners approved for use in fillings for bakery products (at a max. concn. of 3 g/kg). AJDW

35

[Gelling agent for gelling or thickening of edible materials.] Gelierhilfe zum Gelieren oder Andicken von Nahrungs- und Genussmitteln.
Oswald, G. (Opekta-Gesellschaft mbH & Co.)
German Federal Republic Patent Application 2 836 140 (1980) [De]

A gelling material for sweets, jams, jellies etc., contains a mixture of pectin or pectin derivatives, carrageenan and possibly galactomannose (as obtained from the carob bean). A buffer system of malic, tartaric and/or citric acid and their K salts and various sugars are also present. W&Co

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FAB 42

THICKENERS AND GELLING AGENTS

SELECTED FROM VOLUME 13
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Coverage of the subject has been restricted to that of Food Science and Technolggy Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

EDITOR

1

[Effect of sodium chloride on the properties of agaroid gels.]
Stavrov, S. N.; Bounegru, F. P.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 6, 17–20 (1979) [4 ref. Ru] [Kishinevskii Ordena Trudovogo Krasnogo Znameni Gosudarstvennyi Univ. im. V. I. Lenina, Kishinev, USSR]

The effect of an addition of NaCl on the limit tension of movement, thawing temp. and gelling temp. of agaroid solutions was studied. An addition of 0.3 to 0.35% NaCl to the jellies produced from sugar solutions and syrups with added citric acid resulted in a 25% reduced consumption of gelling agent. The physical and sensory properties of jellies as well as their resistance to the unfavourable action of acid at high temp. remained unchanged. The application of sodium lactate in amounts <0.5% did not improve the consistency of jellies or their resistance to undesirable effects of acid at high temp. STI

2

Gel with 'cuttable texture' produced without heat. ✓
Andres, C.
Food Processing 40 (6) 74–75 (1979) [En]

A bland-tasting, modified food starch based on tapioca and which forms a rigid, cuttable but tender gel without heating has been developed for use in a wide range of food products, e.g. pie and pastry fillings and imitation jellies. Gels produced with the pre-gelatinized tapioca starch can be used under a wide range of pH and sugar content conditions, and do not toughen with ageing. JRR

3

[Starch foodstuff.]
Ajinomoto Co. Ltd.
Japanese Examined Patent 5 518 513 (1980) [Ja]

Paste foods are made from combinations of degraded or aged starch together with fresh starch to provide improved texture and flavour. IFT

4

Cold-water dispersible, gelling starches. ✓
Chiu, C.-W.; Rutenberg, M. W. (National Starch & Chemical Corp.)
United States Patent 4 207 355 (1980) [En]

Method for the preparation of a cold-water dispersible, modified starch which forms a gel with a Bloom strength of at least 45 is described. A tapioca starch is converted to a water fluidity of approx. 10–63, preferably 20–40, reacted with a crosslinking agent to within defined Brabender viscosity limits sufficient to provide the modified starch with gelling properties, and drum-dried to give the modified starch product. The gelling instant starchis particularly useful in food systems of the type which gel upon standing, such as pie fillings, jellies, and puddings. RAW

5

Pudding starch. ✓
O'Rourke, J. D. (General Foods Corp.)
United States Patent 4 215 152 (1980) [En]

A dry pre-gelatinized starch product is described suitable for use in instant puddings and contains a protein and an emulsifier to impart, upon reconstitution, a creamy smooth, viscous and glossy character. IFT

6

Alginates in modern processed foods.
Littlecott, G. W.
South African Food Review 7 (3) 18, 20, 23, 25–26 (1980) [En] [Alginate Ind. Ltd., London, UK]

The chemical structure of alginates and their behaviour in solution are briefly discussed and some of the food processes that use alginates are described. Applications of alginates include: thickening, e.g. used for prevention of leakage of ripple syrups into ice cream, and thickening of the wet mixture of ginger cake; water control in icing, piping gels, bakery jams, glazes and freeze/thaw stable jellies; gelation e.g. used for reformed peppers for stuffed olives, reformed onion rings, squid rings, and anchovy strips, fruit processing a homogeneous texture (e.g. apples, pears, peaches, apricots), soft centred fruits (e.g. cherries and gooseberries), liquid-centred fruits (e.g. blackcurrants, redcurrants), fruit processing a heterogeneous texture (e.g. oranges, lemons), reformed meat and fish, dairy products (bakery custards and freeze/thaw stable egg custard) and instant desserts; and stabilization e.g. include stabilization of beer head, salad dressings and fruit squash. SP

7

[Process for making mayonnaise.]
Safonova, L. V.; Baranov, V. S.; Mikhailov, V. S. (**Union of Soviet Socialist Republics,** Moskovskii Ordena Trudovogo Krasnogo Znameni Institut Narodnogo Khozyaistva im. G. V. Plekhanova)
USSR Patent 719 594 (1980) [Ru]

The process involves dissolving dry basic materials in water, adding thickening agent and vegetable oil, mixing, adding acid and homogenizing. To maintain the nutritive value while obtaining a cheaper product, the thickener is homogenized sea kale. The vegetable oil is added to the sea kale and mixed continuously at 45–60°C. The mixture is maintained at this temp. for 30–40 min, and the solution of the dry ingredients is then added. W&Co

8

Changes in the birefringent characteristics of cereal starch granules at different temp. and water activities.
Marchant, J. L.; Blanshard, J. M. V.
Stärke 32 (7) 223–226 (1980) [7 ref. En, de] [Food Sci. Lab., Dep. of Applied Biochem. & Nutr., Univ. of Nottingham, School of Agric., Sutton Bonington, Loughborough, Leics. LE12 5RD, UK]

Small angle light scattering was used to study the major and abrupt changes in birefringence that occur on gelatinization. The effects of annealing and added solutes can be readily followed. In addition more subtle modifications which reflect changes in order in the granules can be examined. This has been exemplified by the gelatinization behaviour under conditions of reduced water activity. These results are compared with those of other authors using the equation developed by Flory to describe the effect of diluent upon the order/disorder transition in polymers. AS

9

[Thermal behaviour of high molecular substances in foods. III. Effects of salts and sugars on the gelatinization temperature of starch.]
Takahashi, K.; Shirai, K.; Wada, K.; Kawamura, A.
Journal of the Japanese Society of Starch Science [Denpun Kogyo Gakkaishi] 27 (1) 22–27 (1980) [15 ref. Ja, en] [Dep. of Agric. Chem., Fac. of Agric., Tokyo Noko Univ., 3-5-8 Saiwai-cho, Fuchu, Tokyo 183, Japan]

It was indicated previously that the gelatinization temp. (GT) of starch in food and isolated starch could be determined successfully by differential thermal analysis (DTA). In this investigation, the effect of salts and sugars on GT of starch was studied by DTA in aqueous medium. NaF increased GT, while NaCl, NaBr or NaI decreased it in order of the periodic table. Sodium carbonate and bicarbonate had no influence on GT, and nitrate and perchlorate decreased it, while sulphate, phosphate and thiosulphate increased it strongly. The influences of salts of organic acids on GT were relatively small, while sugars had great increasing effects. Differences between these substances in their influence on GT could be demonstrated quantitatively by the critical concentration index, defined as the index of min. concn. required to make a change in GT. This index was in linear relation with the lyotropic value and the hydration number of ions, and furthermore correlated very closely with the B-coeff. of salts. This suggests that the ability of salts to influence the water structure takes part in the gelatinization phenomenon of starch. AS

10

[Evaluation of radioactivity of food stabilizers, algae and their derivatives.]
Pomarola, H.; Augustin, C.
Medecine et Nutrition 16 (3) 199–201 (1980) [Fr, en] [Lab. Cent. de Recherches & d'Analyses, Service de la Repression des Fraudes & du Controle de la Qualite, Massy-91200, France]

The potential for uptake of radioactive isotopes by marine algae (especially those growing in the vicinity of nuclear waste disposal sites) and consequent increased radioactive isotope concn. in derived food stabilizers and thickeners is discussed. Data are given for activities of ^{238}U, ^{226}Ra, ^{232}Th, ^{137}Cs, ^{40}K, ^{144}Ce, ^{103}Ru, and ^{95}Zn in the algae *Chondrus crispus* (including samples from the vicinity of a nuclear waste disposal site), *Eucheuma spinosum* and *Gelidium* sp., in thickeners and stabilizers (Satialgine, Satiagel, carrageenan and agar) derived from these algae; and in a sample of gum acacia. The results show that a moderate degree of accumulation of radioactive isotopes by marine algae may occur; however, radioactivity of the derived stabilizers and thickeners is too low to present any health hazard. Radioactive isotope concn. in gum acacia were very low. AJDW

11

[Analytical characterization of polysaccharide-based thickeners. I. TLC identification.] Analytische Charakterisierung von Verdickungsmitteln auf Polysaccharidbasis. I. Dünnschicht-chromatographische Identifizierung.
Friese, P.
Zeitschrift für Analytische Chemie 301 (5) 389–397 (1980) [15 ref. De, en] [Henkel KGaA, Postfach 1100, 4000 Düsseldorf 1, Federal Republic of Germany]

Polysaccharides in commercial thickeners are identified by 3 methods: (i) TLC, (ii) GLC after Zeisel cleavage with hydriodic acid and (iii) IR spectroscopy. This first part describes the hydrolysis of thickeners to monomers and their subsequent TLC characterization. The thickeners are enriched by extraction, hydrolysed for 36 h at 100–110°C by 0.15N H_2SO_4 in a special pressure tube, neutralized, filtered over ion exchange resin, freeze-dried, and characterized by TLC on 2 different supporting media (cellulose and silica gel) with 2 different mobile phases (isopropanol/pyridine/acetic acid and butanol/acetone water) and 3 spray reagents (anisidine/phthalic acid, aniline/diphenylamine/phosphoric acid, and vanadium pentoxide/H_2SO_4). Monomers are characterized by R_f value and colour. Many thickeners can be identified by combining the results of various thin layer chromatograms. The results are illustrated in tables and chromatograms (e.g. for a mixture of starch and guar flour, distinction of agar, alginate, various gums). [From En summ.] RM

12

[Hydrocolloids as food additives; current EEC and Federal German legislation.] Hydrokolloide als Lebensmittelzusatzstoffe; derzeitige Regelungen in der EG und in der Bundesrepublik Deutschland.
Kuhnert, P.
Gordian 80 (7/8) 172, 174–180 (1980) [14 ref. De, en]

A survey is given of the state of food legislation on thickening and gelling agents including chemically modified starches, according to EEC directives and Federal German regulations as of mid-1980. Tabulated data give EEC directives and ADI (acceptable daily intake) values for substances recommended for admission, not recommended for admission, not affected by the directive, and proposed but not yet passed; and for thickener permitted in Federal Germany, generally admitted for foods with no limit on amount, generally admitted for foods (with max. permitted amounts) and admitted for certain foods only (with max. permitted amounts.). RM

13

Demineralised whey cost saver for chocolate makers.
Salsbury, N.
Confectionery Manufacture and Marketing 17 (7/8) 30–31 (1980) [En]

The ion-exchange process used at the Express Creameries plant at Appleby, UK, for demineralizing whey from up to 320 000 l cheese milk used daily in Cheddar cheese manufacture is described. It involves centrifugal separation of fresh cheese whey to remove curd fines and fat, pasteurization, cooling to 6°C and demineralization in 2 beds of specially selected resins.

In the first which contains cation exchange resin and is saturated with H ions these are exchanged for cations (Na, K, Ca, etc.) in the whey. The second, the anion column, is saturated with hydroxyl ions which are exchanged for anions in the whey such as chloride, phosphate, sulphate etc. The cations and anions retained in the resin are removed in regeneration cycles. The demineralized whey is concentrated by reverse osmosis to 12% TS, evaporated thermally and dried. The product, containing 81% lactose, 13% whey proteins, 0.8% minerals, 0.8% milk fat and 3% moisture is for use in infant milk formulae, dietetic foods, ice cream and frozen desserts; it is also an inexpensive bulking agent. It can be produced in individual specifications to meet particular requirements and custom blends of whey and skim-milk-based products may also be supplied. AS

14

Carrageenan, pectin and xanthan/locust bean gum gels. Trends in their food use.
Pedersen, J. K.
Food Chemistry 6 (1) 77-88 (1980) [En] [A/S Kobenhavns Pektinfabrik, DK-4623 Lille Skensved, Denmark]

The gelling agents carrageenan, pectin and xanthan/locust bean gums gels are discussed in detail. Their values in food formulations are considered, with some estimate of their future development. AS

15

[Analytical determination of the mineral nutrients in *Gracilaria* sp., and their influence on the strength of the agar gel.]
Morris Peralta, A. E.
Anales de la Facultad de Ciencias Quimicas y Farmacologicas, Universidad de Chile 29/30, 61-62 (1979) [Es, en]

Samples of *Gracilaria* seaweed were taken from different locations during 4 seasons and the relationship between the macro and micro nutrients and the strength of the agar gel was studied. Agar obtained by north American methods was of better quality than that by Japanese methods, and the Ca/Na relation was greater. AL

16

Potential hazards of carrageenan.
Marcus, R.; Watt, J.
Lancet 1 (8168) 602-603 (1980) [10 ref. En] [Clatterbridge Hospital, Bebington, Cheshire, UK]

Possible toxic and teratogenic effects of edible quality undegraded carrageenan are discussed, with reference to animal feeding trials showing an increased incidence of stillbirths, bronchiectatic cavitation of the lungs, hepatomegaly, ulcerative disease and polypoidal lesions of the colon, and hyperplastic changes in the mucosa of the alimentary tract; reports of carcinogenicity of carrageenan are also considered. It is suggested that there is a need for caution in the use of carrageenan as a food additive, especially as other stabilizers are available. AJDW

17

Carrageenan toxicity.
Thomson, A. W.; Fowler, E. F.; Sljivic, V. S.; Brent, L.
Lancet 1 (8176) 1034 (1980) [12 ref. En] [Dep. of Path., Univ. of Aberdeen, Foresterhill, Aberdeen AB9 2ZD, UK]

The letter of Marcus & Watt on potential dangers of dietary carrageenan [see preceding abstr.] is discussed; further possible adverse effects of dietary carrageenan are considered, including effects on intravascular coagulation, nephrotoxicity, increased sensitivity to endotoxin, suppressive effects on immunity reactions, and potentiation of tumour growth. Persistence of orally-administered carrageenan in Küpffer cells is also discussed. AJDW

18

Carrageenan.
Gangolli, S.; Miller, K.; Hopkins, J.
Lancet 2 (8185) 87 (1980) [14 ref. En] [British Ind. Biol. Res. Ass., Carshalton, SM5 4DS, UK]

The comments of Marcus & Watt, and of Thomson et al. [see preceding 2 abstr.] on possible adverse effects of dietary carrageenan are discussed, with special reference to the importance of dose level for such effects. An animal feeding trial showing no teratogenic effect of 0.5-5.0% dietary carrageenan on rats is mentioned. Implications of carrageenan-induced colonic ulceration in guinea pigs and rabbits are discussed. AJDW

19

Commercial exploitation of marine red algal polysaccharides - progress and prospects.
Guiry, M. D.
Tropical Science 21 (3) 183-195 (1979) [48 ref. En, fr, es] [Dep. of Botany, Univ. Coll., Galway, Irish Republic]

Agar and carrageenan gums are produced from marine red algae (Rhodophyta), and used as thickeners and stabilizers in various food products including canned meat, confectionery and ice cream. This paper reviews composition, sources, uses, collection, and growth studies being performed to increase the potential for use of these gums. LH

20

[Legal evaluation of alginic acid and alginate additions.] Ergänzende Ausführungen über die lebensmittelrechtliche Beurteilung des Zusatzes von Alginsäure und Alginaten.
Schmidt, E. K. H.
Gordian 80 (7/8) 180-183 (1980) [De]

Earlier information [see FSTA (1980) 12 4U367] is supplemented and brought up-to-date with information on: admission of calcium tartrate; special demands on purity of thickening and jelling agents, standardization through sugar; regulation on special dietary foods; cheese regulation; health foods with alginate; fish and fish products; Protan-Frostgel procedure; definitions; and slimming products (stomach fillers, appetite reducers). RM

21

[Agar-agar.]
Taiwan, National Bureau of Standards
Chinese National Standard **CNS N5159,** 1p. (1979)
[Ch]

22

[Test method for agar-agar.]
Taiwan, National Bureau of Standards
Chinese National Standard CNS N6113, 1p. (1979)
[Ch]

23

Food products containing potato pulp.
Roquette Freres SA
British Patent 1 571 405 (1980) [En]

Potato pulp product containing a gelatinized starch is employed as a thickener in a variety of foods, e.g. fruit pastes, marmalades, confectionery etc. RAW

24

[Rheology of agar gel.]
Evtushenko, V. A.; Preobrazhenskaya, N. G.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 3, 123–126 (1980) [4 ref. Ru] [Arkhangel'skii Med. Inst., Arkhangel'sk, USSR]

A strength factor for agar gel rheology was sought using the Valent instrument; the gel strength value is a complex variable comprising ultimate resistance of the gel under uniaxial compression, and limit resistance to bending of the surface layer. Two flat pieces permit separation of the gel resistance by deformation and provide information on surface dimensions and limiting shear stress. The height of the block of gel need not be less than the piece diam.; but the block diam. must be at least 10 mm greater than the piece diam. STI

25

[Analytical characterization of polysaccharide-based thickeners. II. Qualitative and quantitative determination by Zeisel-cleavage.] Analytische Charakterisierung von Verdickungsmitteln auf Polysaccharidbasis. II. Identifizierung und Bestimmung durch Zeisel-Spaltung.
Friese, P.
Zeitschrift für Analytische Chemie 303 (4) 279–288 (1980) [15 ref. De, en] [Henkel KGaA, Postfach 1100, D-4000 Düsseldorf 1, Federal Republic of Germany]

The characterization of cellulose ethers and mixed cellulose ethers by GLC is described giving methylhydroxy ethyl cellulose (MHEC) as an example. This highly sensitive quantitative method is needed to distinguish and identify cellulose derivatives with little ether substitution. The cellulose ethers are heated at 140°C with HI in a specially developed apparatus. The alkyl iodides formed are distilled into cooled hexyl bromide. They are separated and identified by GLC. Any olefines formed are determined by addition of Br_2. The reproducibility is $\leq 3\%$, limit of detection 0.01% hydroxyethyl cellulose (HEC). The method can also be used for detn. of esters (e.g. pectins, hydroxy ethyl starch), S-alkyl groups, methylimides, and some detergents. The method can be applied directly, without prior sample preparation. [From En summ.] [See FSTA (1981) 13 3T150 for part I.] RM

26

Absorbent polymeric compositions derived from corn flour and starch.
Antholz, P.; Swarthout, E. J. (Illinois Cereal Mills)
United States Patent 4 221 684 (1980) [En]

Absorbent polymeric compositions are described which are prepared by graft copolymerizing acrylonitrile onto a starch or corn flour-containing substrate followed by subjecting the graft copolymer to alkaline saponification. A polymeric composition of increased absorbency is obtained by isolating the saponified graft copolymer from solution as a colloidal precipitate subsequent to the slow addition of an alcohol to the solution. These compositions can be used as thickening or viscosity control agents in aqueous systems. RAW

27

Guar: agronomy, production, industrial use, and nutrition. [Book]
Whistler, R. L.; Hymowitz, T.
ix + 124pp. ISBN 0-911198-51-2 (1979) [many ref. En] [West Lafayette, Indiana, USA; Purdue University Press. Price $9.95]

This book, written in response to a United Nations and World Health Organization request for a compilation of the known facts about guar, should be of use to agronomists, nutritionists, industrialists and to organizations concerned with providing an additional crop source of valuable protein for a part of the world's food needs. Chapters included are: History (pp. 1–15, 122 ref.) including common names and traditional uses. Speciation and cytogenetics (pp. 16–28, 48 ref.). World production (pp. 29–34). Breeding, genetics, and physiology (pp. 35–56, 100 ref.). Crop protection (pp. 57–77, 102 ref.). Crop production (pp. 78–95, 110 ref.). Structure and properties of guar endosperm polysaccharide (pp. 96–100, 14 ref.). Guar gum: production and industrial uses (pp. 101–113, 15 ref.) including composition, production, grades, and uses (processed cheese products, beverages, baked goods, pastry icings, meat binder, canned meat products, dressings and sauces). Nutritive value and food use (pp. 114–120, 38 ref.). VJG

28

[Additives with direct and indirect emulsifying and/or stabilizing action.] Zusatzstoffe mit direkter und indirekter emulgierender und/oder stabilisierender Wirkung.
Ingenpass, P.
Feinkostwirtschaft 16 (6/7) 47–50 (1979) [13 ref. De]

The origins, modes of action of, and differences between stabilizers and emulsifiers are briefly discussed, with reference to a few examples of each type and to the nature of emulsions in general. The suitability of several hydrocolloid stabilizers for applications such as thickening or gelling agents is summarized in a table. JRR

29

[Starch thickener.] ✓

Sugiyama Sangyo Kagaku Kenkyusho

Japanese Examined Patent 5 536 308 (1980) [Ja]

The viscosity of sauce compositions is increased by the use of a starch powder containing added protein which is preheated with agitation prior to introduction IFT

30

Effects of emulsifying salts and carrageenan on rheological properties of cheese-like products prepared by direct acidification.

Lazaridis, H. N.; Rosenau, J. R.

Journal of Food Science 45 (3) 595–597 (1980) [17 ref. En] [Dep. of Food Eng., Univ. of Massachusetts, Amherst, Massachusetts 01003, USA]

Effects of 5 emulsifying salts and a blend of carrageenan on rheological properties of nonfermented, nonrenneted cheese-like products produced by direct acidification were evaluated. The tested salts included: trisodium phosphate, disodium phosphate, sodium citrate, sodium aluminium phosphate (kasal) and a blend of sodium metaphosphate and trisodium phosphate (kasomet). Among the evaluated rheological properties, emphasis was given to 'meltability' as measured by the standard L. D. Schreiber test. Trisodium and disodium phosphate were found to produce the most pronounced melting effects, while kasal and kasomet produced no melting effect at all. Carrageenan (mainly of kappa-type) at levels up to 1.0% improved 'body', 'texture', and mouth-feel of the products but countered the improved melting characteristics produced by the salts. Through proper selection of the kind and level of emulsifying salt and concn. of carrageenan, relative control of the rheological properties was shown to be feasible. IFT

31

[Gelling and thickening agents in foods.] Gelier- und Verdickungsmittel in Lebensmitteln. [Conference proceedings]

Neukom, H.; Pilnik, W. (Switzerland, Schweizerische Gesellschaft für Lebensmittel-Wissenschaft & Technologie) (Editors)

354pp. (1980) [many ref. De, En, Fr] Zürich, Switzerland; Forster Verlag AG

This publication presents the full text of lectures presented at a meeting held in October 1978 at the Eidgenössische Technische Hochschule, Zürich, Switzerland, including the following. Structure and characteristics of polysaccharides, by H. Neukom (pp. 11–29, 12 ref., De). Starch and water, by J. Hofstee (pp. 31–47, 13 ref., De). Modified food-grade starches, their manufacture and characteristics, by G. Graefe (pp. 49–66, 27 ref., De). Pectins and alginates, by W. Pilnik & A. G. J. Voragen (pp. 67–94, 52 ref., De). Galactomannans: production, structure and characteristics, by E. Nittner (pp. 95–112, 25 ref., De). Carrageenan, agar and xanthan as gelling agents and stabilizers, by J. K. Pedersen (pp. 113–133, 5 ref., De). Use and technology of exudate gums from tropical sources, by G. O. Phillips, G. Pass, M. Jefferies & R. G. Morley (pp. 135–161, 37 ref., En). Relationship between structure and properties of water-soluble cellulose ethers, by E. D. Klug & H. E. t'Sas (pp. 163–174, 7 ref., En). Edible gelatin – characteristics and quality, by R. Schreiber (pp. 175–190, 12 ref., De). Detection and determination of gelling and thickening agents, by E. Mergenthaler & H. Scherz (pp. 191–212, 7 ref., De). Rheological and sensory evaluated properties of food gels, by P. Sherman (pp. 213–223, 36 ref., En). Nutritional physiology aspects of some gelling and thickening agents, by E. W. Hellendoorn (pp. 225–238, 58 ref., De). Toxicological aspects of thickening and gelling agents in foods, by E. Bachmann & G. Zbinden (pp. 239–247, 32 ref., De). Gelling and thickening agents: legal aspects, by T. Avigdor (pp. 249–261, 25 ref., De). Application and action of hydrocolloids in dairy products, by T. H. M. Snoeren (pp. 263–274, 6 ref., De). Use and function of pectin in manufacture of jams and marmalades, by E. Pierhöfer (pp. 275–282, De). The importance of endogenous and exogenous polysaccharides in manufacture of turbid beverages from fruit and vegetables, by U. Schobinger (pp. 283–302, 68 ref., De). Practical aspects of manufacture of gum – and jelly-type confectionery, by Y. Fabry (pp. 303–320, De). Application of thickening and gelling agents in soups, sauces, mayonnaise and related products, by H. A. M. Hoek (pp. 321–330, 9 ref., En). Gelling and thickening agents in foods of animal origin – applications and effects on quality, by J. E. Reichert (pp. 331–344, 10 ref., De). Thickening agents as carriers for flavourings and colorants, by R. Josse & P. Gamper (pp. 345–354, 5 ref., Fr). AJDW

32

Potential use of fruit waste containing in vivo de-esterified pectin as a thickener in canned products.

Speirs, C. I.; Blackwood, G. C.; Mitchell, J. R.

Journal of the Science of Food and Agriculture 31 (12) 1287–1294 (1980) [10 ref. En] [Dep. of Applied Biochem. & Nutr., Univ. of Nottingham, Nr. Loughborough, Leics., LE12 5RD, UK]

Orange peel and tomato skins were treated with Na_2CO_3 to pH 8.5 to cause *in vivo* pectin de-esterification principally by pectinesterase action. The resulting material was dried and powdered and then evaluated for thickening properties in canned systems. It was found that after autoclaving for 75 min at 121.1°C in a rotating retort in the presence of guar gum, sodium tripolyphosphate and $CaSO_4.2H_2O$, high post process viscosities could be obtained when orange peel was included at a concn. of 0.5% provided the pectin degree of esterification was reduced below 20% and the intrinsic viscosity of the pectin measured after extraction was above 3 dl g^{-1}. Thickening was also obtained with tomato skins providing these 2 conditions were fulfilled. The dependence of viscosity on the Ca level and the thixotropic nature of the solutions obtained after processing, demonstrate that a calcium pectate gel can be formed even after severe heat treatment at a neutral pH. Fruit and vegetable material containing *in vivo* de-esterified pectin may be of value as a thickener in canned foods. AS

33

Acacia gums in emulsifiers.
Thevenet, F.
Food, Flavourings, Ingredients, Packaging and Processing 1 (12) 15-16 (1980) [En] [Food Dev. Tech., Iranex, France]

Aspects of the topic considered are: occurrence of gum arabic; different qualities of gum acacia; purification (dry treatment and wet treatment); chemical and physical properties of gum arabic (chemical configuration, viscosity, acidity); soft drinks use; preparation of aqueous phase; suggested formulations (French, USA and Japanese types); and spray-dried flavours. VJG

34 √

Process of increasing viscosity in agitated milk systems.
Igoe, R. S. (Merck & Co. Inc.)
United States Patent 4 219 583 (1980) [En]

In a typical example, the viscosity of cold milk is increased under agitation by adding a preblended mix of equal amounts of tetrasodium polyphosphate and xanthan gum to the milk to give, preferably, 0.09-0.3% (w/v) in the milk. EJM

10 P 1845

[Recent developments in milk protein chemistry.]
[Review]
Lasztity, R.
Tejipar 30 (1) 2-7 (1981) [17 ref. Hu, en, ru] [BME Biokemiai es Elelmiszer-tech. Tanszek, Budapest, Hungary]

Latest knowledge on milk proteins is reviewed, with particular regard to their composition and amino acid sequence, genetic variants, biosynthesis and biological functions. Changes in proteins during milk processing are also discussed. The paper was presented at a meeting of the MTA Food Protein Chemistry Committee in Pecs, Hungary, on 23 Sept. 1980. ADL

35

Rheological properties of agarose-gelatin gels.
Watase, M.; Nishinari, K.
Rheologica Acta 19 (2) 220-225 (1980) [18 ref. En, de] [Dep. for Liberal Arts, Shizuoka Univ., Ohya, Shizuoka, Japan]

Stress relaxation measurements were made on agarose-gelatin aqueous gels. The results were analysed in terms of a 6-element model composed of 3 Maxwell elements in parallel. The temp. and concn. dependences were examined. E_1, the elastic modulus of the Maxwell element with the longest relaxation time, reflects the elasticity of the main network structure. The observed values of E_1 were compared with those calculated by a formula for the composite system. Since the observed values were much smaller than the calculated values, the gelling process of the agarose was considered not to be a simple dispersion of agarose in a gelatin medium, but rather that gelation was hindered by the gelatin. The stress-strain curves for the system were also obtained. AS

36

Functional properties of a food colorant prepared from red cabbage.
Sapers, G. M.; Taffer, I.; Ross, L. R.
Journal of Food Science 46 (1) 105-109 (1981) [14 ref. En] [USDA-SEA-AR E. Reg. Res. Cent., 600 E. Mermaid Lane, Philadelphia, Pennsylvania 19118, USA]

Spectral, colorant, and stability properties of colorants based on red cabbage, grape, cranberry, beet, and Red No. 40 were compared in buffer and in a simulated beverage. At pH 3, red cabbage imparted a red colour similar to that of beet juice and less orange than that of the other colorants. Increasing the pH of red cabbage extracts to 4 produced a bathochromic shift and decreased colour strength. Tristimulus parameters displayed maxima when L was varied. Red cabbage pigments were more stable during heating and storage than were the other colorants tested. pH had little effect on colour stability; exposure to light greatly increased colour loss during storage. IFT

37

[Improved milk protein product based on casein or caseinate and process for its manufacture.]
Verbessertes Milcheiweissprodukt auf Basis von Casein oder Caseinat und Verfahren zu seiner Herstellung.
Schröder, K. (Meggle Milchindustrie GmbH & Co. KG)
German Federal Republic Patent Application 2 910 665 (1980) [De]

According to 1 of 13 examples of application, 740 kg commercial acid casein are sprayed under vigorous stirring with 230 kg aqueous solution of 1.9% NaOH, 6.3% tri-sodium citrate, 9.7% sodium bicarbonate and 1.7% of a 40% formaldehyde solution. After 60 min holding at about 30°C the product with 26% moisture is dried and milled to <0.250 mm particle size. The final product (sodium caseinate) contains on average 5.6% moisture, 88.9% protein, 0.7% fat and 3.9% ash. The product has improved dispersibility in water and increased viscosity which makes it particularly suitable for use as a thickening/emulsifying agent in meat products; further uses are in dietetic foods. FL

38

Edible aqueous acid food thickener dispersion and process therefor.
Maerker, K.; Bezner, K.; Biller, F.; Bohrmann, H. (CPC International Inc.)
United States Patent 4 252 835 (1981) [En]

An acidic, aqueous dispersion contains ≥1 thickener. The dispersion may be used either directly as or as a base for a viscous additive to pasty, storage-stable and nonsegregating food mixtures, e.g. salad dressings, mayonnaise etc. It contains ≥1 edible acid and has a pH of approx. 2.5-6.7. At least 1 of the thickeners contained in the dispersion consists of amorphous and/or microcrystalline glutamic acid in a concn. of approx. 6-60% by wt., based on the total wt. of the dispersion. Methods of preparing and using the dispersion are also described. RAW

39

Novel aroid products.

Tu, J. C. C. (United States of America, Secretary of Agriculture)

United States Patent 4 246 289 (1981) [En]

Products are prepared from aroid corms by first peeling and washing the corms and then cutting the corms into pieces. Aqueous alkali is applied to the corms to remove acid principles and then the corms are treated with aqueous hydrogen peroxide to prevent discoloration. The so-treated corms are washed with water until they are neutral and then dried. The product is easily stored and requires no refrigeration, unlike poi. They are easily prepared for consumption by simply cooking in boiling water for short periods. The gum like substance produced by rehydration of the precipitate can also be used as an emulsifier, thickener etc. RAW

40

Process for modifying starch with sodium or calcium stearoyl-2-lactylate.

Mitchell, W. A.; Seidel, W. C. (General Foods Corp.)

United States Patent 4 260 642 (1981) [En]

Process is described for preparing a pregelatinized modified starch suitable for use in instant puddings. An aqueous slurry containing an ungelatinized starch and an effective amount of sodium or calcium stearoyl-2-lactylate is formed, the slurry is heated to a temp. and for a period of time sufficient to gelatinize the starch, and the starch is recovered. The resultant pregelatinized modified starch has a smoother creamier mouthfeel and has a high sheen. AS

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FAB 42

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Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

EDITOR

1

Characteristics of methylcellulose used in the preparation of food products and meals.]
Zhamkochyan, L. F.; Berdichevskii, V. Kh.; Eidel'man, M. M.; Dudenko, N. V.
Ratsional'noe Pitanie, Respublikanskii Mezhvedomstvennyi Sbornik No. 15, 98-100 (1980) [Ru][Khar'kovskii Inst. Obshchestvennogo Pitaniya, Khar'kov, USSR]

2

Preparation of guar gum.
Rutenberg, M. W.; Molnar, T. R. (National Starch & Chemical Corp.)
United States Patent 4 269 975 (1981) [En]

Guar gum is prepared by hydrating guar splits to increase moisture content, followed by extrusion and grinding. IFT

3 ✓

Subchronic effects of guar gum in rats.
Graham, S. L.; Arnold, A.; Kasza, L.; Ruffin, G. E.; Jackson, R. C.; Watkins, T. L.; Graham, C. H.
Food and Cosmetics Toxicology 19 (3) 287–290 (1981) [11 ref. En][Bureau of Foods, FDA, Dep. of Health & Human Services, Washington, DC 20204, USA]

The acute oral LD_{50} and the effects of 90-day oral administration of guar gum (at levels of 0, 1.0, 2.0, 4.0, 7.5 or 15% in the diet) to Osborne-Mendel rats were investigated. Guar gum significantly reduced body wt. in females of all the treated groups and in males on the 7.5 and 15% dietary levels. At the 15% level, which represents for rats an intake of 15 000 mg/kg/day i.e. over 100 times the 125 mg/kg/day acceptable daily intake, there was some reduction in bone-marrow cellularity. VJG

4 ✓

Rheological properties of hydrocolloids in the presence of sucrose and milk.
Elfak, A. M.; Pass, G.; Phillips, G. O.
Journal of Texture Studies 10 (3) 271-279 (1980) [13 ref. En][Dep. of Chem. & Applied Chem., Univ. of Salford, Salford M5 4WT, UK]

Apparent viscosities of guar gum, locust bean gum, and sodium carboxymethylcellulose (NaCMC) were measured at shear rates of 16-2620 s^{-1} in water, sucrose, milk, and sucrose/milk solutions. The effect of different heat treatments was also studied. For all solutions, a power law equation described the variation of relative viscosity with shear rate allowing comparison of their non-Newtonian behaviour. With the neutral hydrocolloids, the hydration was limited by the presence of sucrose and milk which reduced the effective length of the polymer molecules. The behaviour of the polyanionic hydrocolloid, NaCMC, although influenced by milk and sucrose separately, was controlled by milk in a milk/sucrose mixture. This is due to milk salts which reduced the intramolecular repulsions along the polyanion and substantially lowered its effective hydrated length. AS

5

Rheology of gelatinised starch suspensions.
Evans, I. D.; Haisman, D. R.
Journal of Texture Studies 10 (4) 347-370 (1979) [22 ref. En][Unilever Res. Lab., Colworth House, Sharnbrook, Beds., UK]

When starch powders (corn, potato, tapioca and wheat flour starches and modified corn starch) were mixed with water and heated at or above the gelatinization temp., the granules absorbed large quantities of water and formed a viscous paste. The gelatinized pastes were shear-thinning fluids, whose flow curves fitted the expression $n = ky^m$ over a wide range of shear rates (where n = apparent viscosity, k and m are constants, and y = shear rate). Behaviour at very low shear rates indicated the existence of a yield stress. Under oscillatory shear the elastic moduli of the pastes considerably exceeded the loss moduli, and both showed only weak dependence on frequency over the range 0.002-2.5 Hz. The apparent viscosities, pseudoplasticity constants, yield stresses and elastic moduli of the pastes were all concn. dependent, assuming significant values only when the starch level exceeded a min. concn. In many cases this threshold concn. corresponded closely to the point at which the vol. of flocculated swollen starch granules just filled the total vol. of the system. AS

6

Compositions and method for preparing dessert gels.
Moirano, A. L. (FMC Corp.)
United States Patent 4 276 320 (1981) [En]

Method is described for manufacturing a kappa carrageenan composition for making a water dessert gel. The gel has a controlled melting temp. so as to soften or melt within the mouth of the consumer, provides for excellent flavour release and has good mouth feel. It contains only kappa carrageenan, and sodium salt of a sequestering agent with ionizable potassium in amounts sufficient to sequester all polyvalent cations present. AS

7

An enzymatic method for the determination of yeast cell wall glucan in foods.
Meyer, M. T.; Phaff, H. J.
Journal of Food Science 46 (5) 1489-1492, 1497 (1981) [En][Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Processed cell wall β-glucans prepared from strains of baker's or brewer's yeast can be used as a thickening agent in aqueous food systems and provide a fat-like mouthfeel. An analytical procedure is described for the detn. of the glucan content added to several food products. The method is based on measurement of reducing sugars produced when the food sample, after appropriate pretreatment, is treated with a commercial microbial β-glucanase (Zymolyase) that is specific for the β-linkages present in the glucan polysaccharide of the added yeast cell walls. IFT

8

[Use of new foods and culinary products in rational and dietetic nutrition systems.]
Kvitnitskii, M. E.; Kovtunenko, L. Ya.; Bulgakova, M. K.; Ratushenko, A. G.
Ratsional'noe Pitanie, Respublikanskii Mezhvedomstvennyi Sbornik No. 15, 16–19 (1980) [Ru] [Kievskii Torgovo-ekonomicheskii Inst., Kiev, USSR]

This paper includes the results of many yr research on improving the nutritional and biological value of foods by addition of a variety of edible substances. Particular attention is given to the physical-chemical and general properties of creams and mayonnaises based on galactan, amylopectin starch and methylcellulose. STI

9 ✓

Starch to repress syneresis of curdlan gel.
Ishida, K.-I.; Takeuchi, T.
Agricultural and Biological Chemistry 45 (6) 1409–1412 (1981) [5 ref. En] [Food Res. Inst., Aichi Prefectural Government, Nishi-ku, Nagoya 451, Japan]

Synaeresis behaviour was investigated in gels made from curdlan, a β-1,3-linked glucan obtained from *Alcaligenes faecalis* var. *myxogenes.* Gels made from curdlan alone showed marked synaeresis on storage at 30°C (up to 20% after 120 h). Gels made from curdlan + various sugars or sugar alcohols also showed higher synaeresis, but incorporation of starch in curdlan gels repressed synaeresis. Sugars also increased gel strength; starch decreased gel strength. Effects of various types of starch in curdlan gels were studied; gels contained 2% curdlan and up to 10% starch. Potato and maize starches decreased synaeresis, but soluble starch did not. Curdlan gel stored in water shrank at a rate similar to synaeresis changes observed. Possible function of starch in curdlan gels is discussed. DIH

10 ✓

The agar component of the red seaweed *Gelidium purpurascens.*
Whyte, J. N. C.; Englar, J. R.
Phytochemistry 20 (2) 237–240 (1981) [16 ref. En] [Tech. Services Branch, Dep. of Fisheries & Oceans, 6640 NW Marine Drive, Vancouver, British Columbia V6T 1X2, Canada]

Chemical composition and rheological properties of agar isolated from *Gelidium purpurascens,* the agar after alkaline treatment, and a commercial agar are presented. The agar and alkali-treated agar gave weaker gels, as measured with an Instron 1122, than those of commercial agar. Xylose, glucose and glucuronic acid in the agar were removed together with 86% of the N content on alkaline treatment, indicating occurrence of these residues as carbohydrate-protein complexes. Sequential extraction of the alga accounted for low yields of agar as losses incurred on ethanol precipitation. Acid treatment of the residue from exhaustive aqueous extraction of the alga liberated a further 10% agar with increased gel strengths despite increased glucose inclusion, suggesting a lack of involvement of these 'contaminant' carbohydrate-protein residues in helix coil formation during gelling. AS

11 ✓

Characterization of the effect of solutes on the water-binding and gel strength properties of carrageenan.
Rey, D. K.; Labuza, T. P.
Journal of Food Science 46 (3) 786–789, 793 (1981) [33 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

The water activity of carrageenan gels with incorporated solutes was determined by cryoscopic osmometry. Kappa (κ), kappa-lambda (κλ) and iota (ι) carrageenan were utilized at concn. of 0.1–2% solids producing a sol, viscous sol, and gel. The solutes used were sucrose, NaCl, Na_2SO_4, KCl, NH_4Cl and urea at concn. of 0.05–1.0 kinetic units/kg H_2O. All the solutes were found to give a_w values within 0.0005 units of literature values. The a_w of pure carrageenans at 0.1–2% solids was >0.999. Addition of some solutes increased the water binding of the carrageenan-solute-water system as was found by a lower a_w than expected. This interaction effect increased with increasing concn. of solute and carrageenan and was greater for solutes with lower activity coeff. The interaction effect increased in the following order: Na_2SO_4, NaCl, KCl, and NH_4Cl. The force required to rupture the gel was measured using the Instron Universal Testing Machine. Solutes were found to influence the gel strength of κ and κλ carrageenans, but not ι carrageenan. The solutes increased κλ carrageenan's gel strength in increasing order: urea, sucrose, Na_2SO_4, NaCl, NH_4Cl, and KCl, and κ carrageenan's gel strength in increasing order: sucrose, Na_2SO_4 and NaCl. There appears to be no simple relationship between gel strength and water-binding when solutes are added to carrageenan. IFT

12 ✓

Safety of carrageenan used in foods. [Letter]
Sarett, H. P.
Lancet 1 (8212) 151–152 (1981) [20 ref. En] [Nutr. Sci. Resources, Mead Johnson Nutr. Div., Evansville, Indiana 47721, USA]

The author points out that recent articles questioning safety of carrageenan used in foods do not distinguish between carrageenan and degraded carrageenan nor between injected and orally administered carrageenan. In the opinion of the author the published literature supports the safety of carrageenan as a food additive. DIH

13 ✓

Danger of carrageenan in foods and slimming recipes. [Letter]
Marcus, R.; Watt, J.
Lancet 1 (8215) 338 (1981) [8 ref. En] [Clatterbridge Hospital, Bebington, Cheshire, UK]

In reply to the letter by Sarett [see preceding abstr.] the authors state that reports on harmful effects of carrageenan as a food additive have been based on studies of native and degraded carrageenan and products sold in health food stores. Carrageenan has also been observed to be degraded in the intestinal tract and during food processing at acid pH and high temp. and that toxic properties of carrageenan administered systemically or subcutaneously are relevant to food safety because of the nature of colonic diseases caused by small amounts of degraded carrageenan. DIH

14 ✓

The effect of some meat proteins on the rheological properties of pectate and alginate gels.
Hughes, L.; Ledward, D. A.; Mitchell, J. R.; Summerlin, C.
Journal of Texture Studies 11 (3) 247–256 (1980) [8 ref. En] [Food Sci. Lab., Univ. of Nottingham, Sutton Bonington, Loughborough, UK]

The viscosity of 1% sodium alginate and 1% sodium pectate solutions containing low levels of $CaCl_2$ were investigated using cone and plate viscometers. The level of Ca required to initiate partial gelation was significantly lower for pectate compared with alginate. With increasing $CaCl_2$ concn. the solutions became more pseudoplastic and eventually showed thixotropy. 1% bovine serum albumin or 1% myoglobulin was incorporated into the polysaccharide solutions together with sufficient Ca to cause incipient gelation in the absence of the protein. Myoglobin inhibited the formation of an alginate gel, the effect being greatest at a pH of about 6.3. Bovine serum albumin also inhibited alginate formation, the effect increasing with increasing pH. In contrast the addition of both myoglobin and bovine serum albumin caused gel formation in the presence of pectate below pH 6.0. The results are discussed in terms of the protein/polysaccharide interactions and the polymer/ion interactions that can take place in these systems. The relevance of this work to the use of these polysaccharides as thickeners and gelling agents in canned meat products is considered. AS

15

Functional characteristics of sprout-damaged soft white wheat flours.
Lorenz, K.; Valvano, R.
Journal of Food Science 46 (4) 1018–1020 (1981) [11 ref. En] [Dep. of Food Sci. & Nutr., Colorado State Univ., Fort Collins, Colorado 80523, USA]

Soft white wheat was sprouted in the laboratory for 1, 2 and 4 days, resp., before milling into flours. The flours were used to bake cakes and cookies and to determine thickening powers. The flours milled from wheat which had been sprouted for 2 or 4 days were slightly higher in ash and protein and darker in colour than the flour from the sound wheat. Sprouting of the grain for > 1 day resulted in flours of poor cake baking quality. The cakes were low in volume, had a dip in the centre, a coarse grain and a firm texture. Cookie spreads increased and cookie top grain score improved with longer times of sprouting of the grain, but the crust colour of the cookies darkened. The flavour was not affected by sprouting. The thickening power of the sprout-damaged soft wheat flours decreased with time of sprouting of the soft wheat. Generally, laboratory sprouting of soft white wheat had an adverse effect on the functionality of flours in soft wheat applications. Effects of field sprouting on soft wheat flour performance are expected to be similar to those observed with laboratory sprouted soft wheat. IFT

16 ✓

Rheological properties of aqueous agarose-gelatin gels.
Moritaka, H.; Nishinari, K.; Horiuchi, H.
Journal of Texture Studies 11 (3) 257–270 (1980) [17 ref. En] [Dep. of Home Economics, Showa Women's Univ., Taishido, Setagaya-ku, Tokyo, Japan]

Melting temp. were determined for 1–5% agarose gels, 7.5–40% gelatin gels and mixed gels of different concn. of the 2 hydrocolloids. The dynamic viscoelastic constants were also quantified at 0.05 Hz for mixed gels containing 0.5% agarose and 2.5–20% gelatin. In single component gels, the melting temp. increased with hydrocolloid concn. The melting temp. of gelatin gels was lower than that of agarose gels (22–31°C vs. 69–80°C) and less concn. dependent. The melting temp. of mixed gels was more similar to that of agarose gels at low (2.5–6.25%) gelatin concn. and more similar to that of gelatin gels at high (7.5–20%) gelatin concn. The storage modulus decreased with increasing temp. indicating that the thermal rupturing of the noncovalent crosslinks in the gels was stronger than the entropic behaviour of the network. The temp. dependence of the storage modulus and of the dynamic viscosity increased with gelatin concn. Based on these results and on the detn. of the activation energy it is concluded that in mixed agarose/gelatin gels, the 2 sp. form individual networks which interfere with one another at high concn. AS

17 ✓

[Investigations on irradiated food additives and intermediate products.] Zur Strahlenbehandlung von Lebensmittelzusatzstoffen und -halbprodukten.
Zehnder, H. J.; Ettel, W.
Alimenta 20 (3) 67–70 (1981) [3 ref. De, en, fr] [Eidgenössische Forschungsanstalt für Obst-, Wein- & Gartenbau, CH-8820 Wädenswil, Switzerland]

2 food thickeners – guar gum and carob gum – as well as hazelnut and almond paste and soy flour used for preparing the nut pastes were irradiated at 0.2–5.0 kGy and at 2.5–10.0 kGy resp., and subjected to microbiological, viscosity, sensory and GLC examination. Tabulated results showed that while the microbiological quality of the food thickeners was improved by irradiation, viscosity was reduced even at low levels of 0.2–0.5 kGy, preventing the use of this treatment. Nut pastes were practically germ free after treatment at 5.0 kGy but suffered adverse sensory changes. The hygienic quality of nut pastes could be improved by irradiating soy flour, which in any case is largely responsible for their microbiological contamination: 5 kGy was sufficient to inhibit all microbial growth without adverse effects on sensory quality. RM

18

Effect of sodium hydroxide pretreatment on the relaxation spectrum of concentrated agar-agar gels.
Watase, M.; Nishinari, K.
Rheologica Acta 20 (2) 155–162 (1981) [31 ref. En, de] [Dep. for Liberal Arts, Shizuoka Univ., Ohya, Shizuoka, Japan]

Stress relaxation and ultrasonic absorption measurements were made for agar-agar pretreated with various concn. of NaOH, in order to clarify the dominating factors in its rheological properties. Stress relaxation measurements were made up to 30 h. Relaxation spectra were obtained by the reduced variable method. Gels prepared from agar-agar pretreated with concn. NaOH showed a larger relaxation modulus than those pretreated with more dilute NaOH and those without alkaline pretreatment. It is suggested that hydrogen bonds are newly created as a result of desulphation in the molecule, and then the microcrystalline structure is stabilized. AS

19

Method for modifying texture and flavor of waxy maize starch.
Seidel, W. C.; Stahl, H. D.; Orozovich, G. E. (General Foods Corp.)
United States Patent 4 303 451 (1981) [En]

The flavour of waxy maize starch, intended for use in thickened food compositions, is modified by heat treating the starch to approx. 120–200°C, for a time period of from <1 h up to approx. 24 h. The heat-treated waxy maize is then pregelatinized and remains flavour-free, having a suitable texture for incorporation (by mixing) into thickened food compositions, such as instant puddings. AS

20

Carcinogenicity of carrageenan.
Hopkins, J.
Food and Cosmetics Toxicology 19 (6) 779–781 (1981) [10 ref. En] [British Ind. Biol. Res. Ass., Woodmansterne Road, Carshalton, Surrey, UK]

21 ✓

Caloric utilization and disposition of [^{14}C]polydextrose in the rat.
Figdor, S. K.; Rennhard, H. H.
Journal of Agricultural and Food Chemistry 29 (6) 1181–1189 (1981) [16 ref. En] [Pfizer Inc., Groton, Connecticut 06340, USA]

Polydextrose is a randomly bonded polymer of glucose with sorbitol end groups and citric acid attached by mono- and diester bonds, and is a tasteless nonsweet low calorie bulking agent with a variety of food applications. Rat feeding trials showed that approx. 60% of ingested polydextrose is excreted in the faeces and that approx. 30% is fermented by intestinal microflora. Energy content was estimated to be approx. 1 cal/g. DIH

22

Rheological properties of agar-gelatin gels.
Watase, M.; Nishinari, K.
Report of the National Food Research Institute [Shokuryo Kenkyusho Kenkyu Hokoku] No. 38, 250–255 (1980) [18 ref. En, de] [Shizuoka Univ., Ohya Shizuoka, Japan]

See FSTA (1981) 13 10T514.

23

[Thickener.]
Sanyo Kasei Kogyo KK
Japanese Examined Patent 5 639 793 (1981) [Ja]

Viscosity improving agent, for use e.g. as a food additive, comprises hydrolysed copolymer of acrylamide and starch or cellulose as the main component. IFT

24 ✓

Rheological studies on specific ion forms of ι-carrageenate gels.
Morris, V. J.; Chilvers, G. R.
Journal of the Science of Food and Agriculture 32 (12) 1235–1241 (1981) [21 ref. En] [ARC Food Res. Inst., Colney Lane, Norwich NR4 7UA, UK]

Measurements have been made of the shear modulus for calcium, potassium and sodium ι-carrageenate gels as a function of biopolymer concn. and temp. The results are discussed in terms of the application of rubber elasticity theory. Calcium ι-carrageenate gels appear to possess a random glass-like structure whereas both sodium and potassium ι-carrageenate gels form a pseudocrystalline structure. These differences are tentatively attributed to differences in the solubility of the salt forms which, through controlling the gelation temp., moderate the kinetics of the gelation process. AS

25

Composition and method for preparing dessert gel.
Moirano, A. L. (FMC Corp.)
United States Patent 4 307 124 (1981) [En]

Method is described for producing a κ-carrageenan food composition (also described) that is swellable in cold water and gels at room temp. into a structure that can be released from a mould and has a desirable pulpy mouth-feel. The gel structure obtained can be used as a base in preparing various flavoured instant desserts. [From En summ.] RAW

26

Food Additives and Contaminants Committee review of remaining classes of food additives used as ingredients in food. Report on the review of bulking aids.
United Kingdom, Ministry of Agriculture, Fisheries & Food
Report, Food Additives and Contaminants Committee, Ministry of Agriculture, Fisheries and Food FAC/REP/32, 13pp. (1980) [5 ref. En] [London, UK; H. M. Stationery Office

This report evaluates the safety-in-use of the following food additives used as bulking aids: α-cellulose, polydextrose, psyllium mucilloid, and recommends as follows: α-cellulose and polydextrose complying with appended purity specifications and general purity criteria should be permitted subject to review within 5 yr, but should not be permitted in foods described as being specially prepared for infants and young children. The use of psyllium mucilloid should not be permitted. Pending the outcome of a review of emulsifiers and stabilizers in food, α-cellulose should not be permitted in bread. RM

27

Carrageenan formulations expand new product possibilities.

Anon.

Food Engineering International 6 (5) 48–49 (1981) [En, de, fr, es]

The increasing use of carrageenan products in the food industry is discussed, with reference to their application in no-oil salad dressings, instant puddings (containing milk), syrups (e.g. pancake syrup), and mixed fruit beverage (to suspend the pulp). RAW

28

[A new apparatus for rapid and easy measurement of dynamic viscoelasticity for gel-like foods.]

Nishinari, K.; Noriuchi, H.; Ishida, K.; Ikeda, K.; Date, M.; Fukada, E.

Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 27 (5) 227–233 (1980) [14 ref. Ja, en] [Nat. Food Res. Inst., Min. of Agric., Forestry & Fisheries, 2-1-2 Kannondai, Yatabe-machi, Tsukuba-gun, Ibaraki-ken, Japan]

A description of an apparatus for measurement of viscoeleastic properties is given. The apparatus allows easy and rapid detn. of the complex Young's modulus, in which the real part is determined by the stress in phase with the applied strain, and the imaginary part is given by the stress leading the strain by $\pi/2$. Determinations of these moduli were made for gelatin and agar-agar gels at various concn. and temp., and the equipment was also used for determination of force-deformation curves under constant speed compression and breaking strengths. [From En summ.]. JRR

29

[Cooking of seaweeds. IV. Changes in polysaccharides and metal compositions and in properties of alginate of tangle during cooking.] ✓

Sato, S.; Hata, K.; Sato, K.

Bulletin of the Japanese Society of Scientific Fisheries [Nihon Suisan Gakkai-shi] 47 (3) 429–434 (1981) [8 ref. Ja, en] [Course of Home Economics, Shujitsu Junior Coll., Nishigawara, Okayama 700, Japan]

The water-soluble polysaccharides (SP) of the fronds of tangle, *Laminaria japonica*, decreased rapidly in the early stages of cooking, while the insoluble polysaccharides (IP) decreased slowly, and the effused polysaccharides (EP) in the broth increased throughout cooking. Among the SP-bound metals, K decreased rapidly, and Ca and Mg slowly increased during cooking. In the IP fraction, Ca did not change and the other metals (Na, K and Mg) decreased. In the EP fraction, K decreased slightly, and the other metals increased a little. The metal composition of EP was similar to that of SP of uncooked fronds, and that of SP retained in the cooked fronds similar to that of IP of uncooked fronds. Ca and Mg were predominant in the IP fraction of cooked fronds. The mol. wt. of alginate retained in the cooked fronds was higher than that in EP. Thermal gravimetric analysis showed that the water-holding capacity of sodium alginate solution after heating rose significantly. [From En summ.] [See FSTA (1982) 14 10R624 for part III.] JRR

30 ✓

The potential of peapods as food thickeners.

Taylor, A. J.; Pritchard, S.

Journal of the Science of Food and Agriculture 33 (4) 384–388 (1982) [8 ref. En] [Dep. of Applied Biochem. & Food Sci., Univ. of Nottingham, Sutton Bonington, Loughborough, Leicestershire LE12 5RD, UK]

Peapods were de-esterified to give a crude powder which contained low-methoxyl pectin. Analysis showed that the degree of esterification was reduced substantially from around 60% to about 10%. When this powder was incorporated into a canned minced-beef product in the presence of calcium ions, a gelled product resulted and the degree of gelling was dependent on the amount of powder added. Results from a taste panel indicated that the taste of the peapod thickener was acceptable. AS

31

[Rheological studies of agar-agar gels prepared from makusa (*Gelidium amansii*) gathered in different seasons.]

Watase, M.; Nishinari, K.

Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 28 (8) 437–443 (1981) [24 ref. Ja, en] [Chem. Res. Lab., Fac. of Liberal Arts, Shizuoka Univ., Ohya, Shizuoka City, 422 Japan]

32

[Food additives. Agar. Sodium alga acid.]

China, People's Republic of, China Association for Standardization

China National Standard **GB 1975-1976-80, 9pp. (1980) [Ch]**

This is a compilation of 2 standards: GB 1975-80, agar [from *Gelidium amausii* L.] (pp. 1–4); and GB 1976-80, sodium alga acid $(C_6H_7O_6Na)_n$ [sodium alginate] (pp. 5–9). AL

33 ✓

Polysaccharide and bacterial fermentation process for its preparation.

Suk Kang, K.; Veeder, G. T., III; Richey, D. D.

United States Patent 4 286 059 (1981) [En]

Process is described for producing a heteropolysaccharide by a bacterial fermentation procedure in which a species of bacteria or a mutant thereof is incubated in a fermentation medium containing a carbon source, preferably a hydrolysed starch, and sources of Mg ions, P, N and water, the incubation taking place at approx. 28–35°C. The final product can be used as a thickening or suspending agent in salad dressings and in forming thickened puddings.

34

Newly approved bulking agent replaces higher calorie ingredients. ✓
Anon.
Food Development 15 (7) 38–39 (1981) [En]

Consideration is given to the development by Pfizer, Inc., of polydextrose, a 1-calorie/g non-sweet bulking agent capable of replacing higher calorie ingredients such as sugars, carbohydrates and fats in some food products. The FDA has approved polydextrose for use in frozen dairy desserts and mixes; gelatins, puddings and fillings; baked goods and baking mixes; confections and frostings; chewing gum; salad dressings; and hard and soft candy. Polydextrose is available in 2 forms: an amorphous powder, and a 70% solution of polydextrose partially neutralized with KOH. VJG

35

[Technological properties of starch.]
Skrede, G.
NINF Informasjon No. 2, 77–86 (1982) [6 ref. No]

This review-type article outlines the food uses of starch, and gives details of the major properties of native and physically and chemically modified starches. HBr

36

Electrophoretic method for qualitative and quantitative analysis of gelling and thickening agents. ✓
Pechanek, U.; Blaicher, G.; Pfannhauser, W.; Woidich, H.
Journal of the Association of Official Analytical Chemists 65 (3) 745–752 (1982) [23 ref. En] [Forschungsinst. der Ernährungswirtschaft, Blaasstrasse 29, 1190 Vienna, Austria]

An electrophoretic method was developed for qualitative and quantitative detn. of all common thickening and gelling agents. Thickeners were identified by their migration behaviour, their staining ability, and the characteristic shapes of their electrophoretic zones, and then quantitated in a scanner. A method is also reported for isolating thickeners from food, including removal of fat and dyes by dioxane, enzymic starch degradation, removal of protein by trichloroacetic acid, and precipitation of the polysaccharides by absolute ethanol. Isolation of gelatin is also described. AS

37

[Practical application of gums to food.]
Kono, A.
New Food Industry [Nyu Fudo Indasutori] 23 (4) 51–68 (1981) [6 ref. Ja] [Food Lab., Takeda Yakuhin Kogyo KK, Japan]

After discussing the properties of gums in relation to their potential food use, results from experiments on the use of gums in making pickled Japanese radish (takuan) are described. In this process the radish is first dehydrated by rubbing with salt and it is then layered with bran and the seasoning liquid and incubated. Traditionally rice bran is used, and when wheat bran is used a gum is necessary to promote the right consistency in the product. A gum devised by the author's company for this purpose, Orino TK-1 is of higher viscosity than tamarind gum and carboxymethylcellulose and more stable at varying centrifugal force and shear strength than guar gum or xanthan gum. Orino TK-1 is stable during storage and at varying NaCl (0–10%) and citric acid concn. (0–1.5%). Takuan made with Orino TK-1 added to the bran base at 4.4% had excellent strength, stickiness, 'sliminess', polish and colour, which was not matched by guar gum, xanthan gum or a mixture of guar gum and carboxymethylcellulose. The company has also devised a gum, Orino TB-1, for use in the seasoning for fresh radish pickle; a sample formulation of a seasoning including this is tabulated. CIH

38 ✓

Synergistic blends of cellulase-free xanthan gum and cellulosics.
Baird, J. K.; Sandford, P. A.; Shim, J. L.; (Merck & Co. Inc.)
United States Patent 4 313 765 (1982) [En]

A blend of cellulase-free xanthan gum with a number of cellulosics, including CM cellulose, hydroxyethyl cellulose and hydroxypropylmethyl cellulose is described. At 1:1 wt. ratio, these blends show remarkable viscosities when tested in aqueous solutions of 1%, 0.5%, 0.25% and 0.1% total gum concn. The blends have various applications where cellulosics are used as thickeners, such as in foods or beverage mixes. AS

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